THE CONSERVATIONIST

State of New York Conservation Department April - May 1961

Come In!

One day, before too long, you will be able to walk into any one of nine regional offices of the Conservation Department—dependent upon your area of residence—and emerge X time later with a "package" of plans, expert advice and technical service agreements that will make you a working partner in the conservation of natural resources for the rest of your life, and, we hope, your children's and grandchildren's lives as well.

"Like to read the fine print before you sign up?" Fine, let's review some of the possibilities and benefits. Let's say, for example, you've fled the city and now own one of the thousands upon thousands of beautiful but beat-up hill country farms that make up 1/6th of this State. What are you going to do with it—just let it lie there? Some do, but you wouldn't have gotten as far as this office if that's what you had in mind. No, like almost all such owners you would like to make the property pay at least part of its way, make it a better place to live, and still that persistent voice that keeps suggesting you'd feel better if you could leave the place at least a little better than you found it. How? Well, let's start with that old wood lot, choked up with second, third and even fourth growth everything. It has a future but first you should know just what's there, then have a management plan. We've got it right here in this office—trained foresters and the plan—call it the Forest Practice Act—and it can be your passport to woodland solvency. Same thing goes for those old hay fields and pastures—find what kind of conifers will grow best there, order your trees right here at a special rate, and get expert advice on planting, thinning, marketing Christmas trees.

Now take that boggy swale. The game management fellows here will tell you if it can be developed for a wildlife marsh and give you a hand with it too, along with a special license so you can manage it effectively for a fur crop. You'll get a dividend in waterfowl, too. And that spring run—maybe it's got possibilities for a farm trout pond. The fisheries biologists here can tell you, and how to stock and manage it. It's all part of their plan—the Fish and Wildlife Management Act program—operating right out of this regional office. And you'll have protection under the Conservation Law and the management plan to your property rights—the game protectors from this office will see to that.

Who are all these other people coming in? Oh, most everybody. That fellow is president of the local Rotary Club. He wants a speaker for their next meeting; figures the members should know how important our natural resources are to the economy of the whole community. That young woman is a den mother. She wants some program material for her Cub Scout pack. And that chap works downtown in a garage. He's checking on public campsites; some place he can vacation for a week with his whole family.

Read it all over and it sounds good? You'd like to give us a hand on your own property! That's great, brother—we need your help. It's the only way we'll ever get the job done.
—Editor

THE CONSERVATIONIST

State of New York Conservation Department

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Re-organization of Field Services

A Behind the Scenes Look at the First Major Re-organization in the History of the Conservation Department

by H. G. Wilm, Conservation Commissioner

THE Conservation Department is one of the most interesting agencies in the State government. Its work is more diversified than most State agencies—a fact that adds both variety and spice to our operations. Moreover, we are dealing with living, growing things—plants and animals—as well as people, and this has a fundamental fascination.

Although the Department has several divisions with specialized functions, our principal job and greatest challenge is the management of the State's natural resources: Soil, water, forests, fish, wildlife, and that increasingly important by-product—recreation. Our two largest field organizations—the Division of Lands and Forests, and the Division of Fish and Game—are vitally concerned with the management of these resources, at the grass roots level, and as such resources pertain to the Divisions' complex responsibilities. But managing trees in a forest, pheasants on farmland, grouse in a wood lot, trout in a mountain brook, bass in a river or lake does not fit readily into the conventional administrative pattern. With such variable factors it is difficult to incorporate administrative relationships on the usual organization chart. But for efficient operation it is necessary that functions and responsibilities be spelled out in a concise, clear-cut manner.

Efficient operation is especially necessary when faced with an increasing workload and rapidly changing conditions. Over the years, the tremendous population growth, the spread of industry (and the people employed) into rural areas, the change in agricultural practices, the advance in conservation techniques, all combine to generate an unprecedented demand for more and more services and more and more facilities; especially recreational facilities.

To keep pace with these ever-increasing needs, our field supervisors throughout the State have long been hard pressed to stretch their manpower and equipment in an heroic effort to "make do." As a result, the two big field divisions grew like "Topsy."

Coupled with these demands, a new concept was evolving—the idea of multiple-use. Water supply reservoirs can provide water for irrigation; they can also provide a dividend of fishing and other recreations. The management of a forest may be manipulated to improve game habitat; expand recreational opportunity, while still producing a timber crop. A farmer's change of land-use pattern may build up wildlife population without jeopardy to farm production. Today, this philosophy of multiple resource management is universally accepted by conservation administrators.

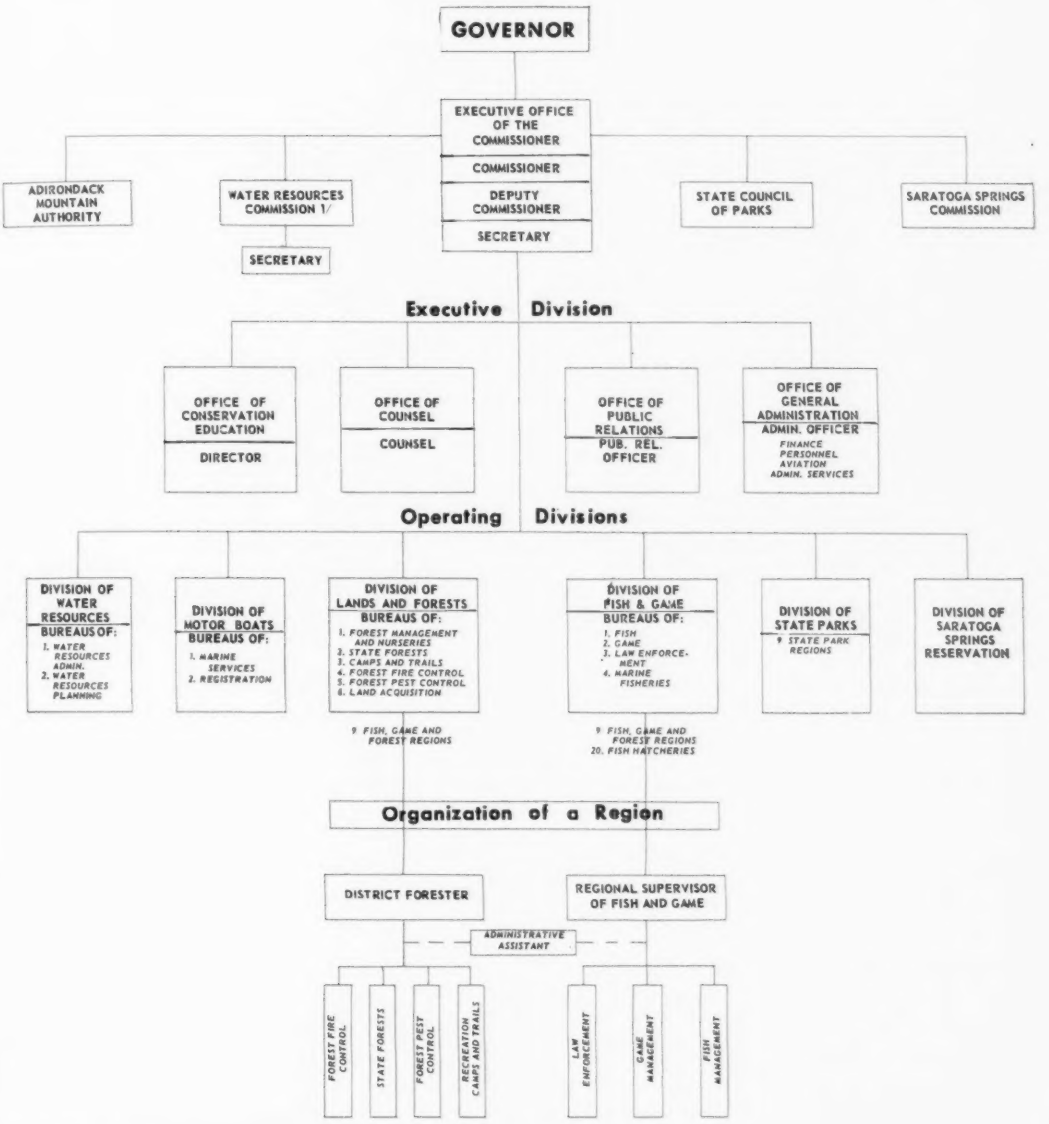
Successful multiple use programs, however, require good co-ordination and close co-operation between field personnel; co-ordination that has been handicapped by an inadequate administrative structure. Field officers responsible for different conservation activities within the same general areas had overlapping territories, and for the most part, different field headquarters. For example, there were 14 forestry districts, 11 fish and game law enforcement districts, 9

In addition to the Divisions of Lands and Forests and Fish and Game discussed in Commissioner Wilm's article, there are four other operating divisions: Parks, Water Resources, Motor Boats and Saratoga Springs.

The Division of Saratoga Springs has a specialized area of responsibility under the administrative supervision of a Commission of which the Conservation Commissioner is the chief executive officer.

At present, the Division of Water Resources and the Division of Motor Boats and their functions are centralized in Albany. The Division of Parks acts in a liaison capacity with the regional park commissions and the State Council of Parks.

The operating divisions are backed up by staff units: the Division of Conservation Education and a Division of Administration which brings finance, personnel and other housekeeping chores under one administrative head.



1/ Members are Conservation Commissioner, Chairman; the Commissioner of Agriculture and Markets, the Commissioner of Health, the Superintendent of Public Works and the Attorney General.

game management districts and 5 fisheries districts—all with different boundary lines and supervised through 35 district offices in 25 different locations. In some situations, field supervisors responsible for approximately the same territory had headquarters separated by 50 miles or more.

This, then, was the situation we faced when I came on the job. Being firmly schooled in the idea that management's right hand must always know what the left hand is doing, I immediately initiated a study of the problem. First we made a careful, comprehensive survey of the administration of our field records; a study which required two years to complete. Our primary objective, as always, was better service to the people of New York State. Wherever possible, we tried to establish regions with similar physical, biological and social characteristics, realizing full well that these living, overlapping values can't be neatly compartmented by a draftsman's line on a map.

We also considered the work loads of the field supervisors and their staffs. Moreover, we wanted to keep to the minimum the uprooting of the families of our supervisors. Wherever possible, we wanted to use existing offices. With respect to families of our field personnel, we gave thought to community facilities in the various sections of the State. In other words, we tried to think with our hearts as well as our heads.

The result of the study was a recommendation for the first major re-organization of the Conservation Department's field forces in its history.

The new administrative structure consolidates all existing districts into 8 upstate Regions and a Marine Region for Long Island and the Metropolitan New York section. The term "Region" is used, incidentally, to avoid confusion with the former districts.

In developing the re-organization plan, we made every effort to avoid the common fault of determining policy in the abstract. In line with this thinking and, after the basic plan had been developed at staff level, we brought in our field personnel—the men whose lives and careers would be most intimately involved with the changes we were considering. The field forces were invited to appraise the proposed re-organization in terms of realistic field operations. As a result of the review by our field personnel, the original plan, which called for 7 Regions, was increased to 8 Regions.

As the plan was unfolding, we made it a point to keep our two important advisory boards, the State Fish and Wildlife Management Board and the State Forest Practice Act Board, abreast of developments. The response of these Boards has been most gratifying. The District Fish and Wildlife Management Boards have already taken steps to adjust their representation to the new regional organizational pattern.

After the plan was reviewed, revised and accepted by all of us in the Conservation Department, the proposal was explained in detail to representatives of the Division of the Budget and the Department of Civil Service. Both agencies gave us fine co-operation. Budget allocated the necessary funds to put the plan into operation and Civil Service promptly established a new job title, Regional Supervisor of Fish and Game, and set up an examination for the position.

For the time being, the newly established Regions will have dual supervision by a District Forester, but these men will operate from a *single* regional office. Incidentally, existing forestry districts, supervised by District Foresters, in most cases, will be retained as they are, within the more encompassing regional boundaries. Eventually, it is planned to have one over-all supervisor in each Region. Also our plans call for an administrative assistant in each Region to handle purchasing, payrolls, inventories and the many other housekeeping chores. This will relieve the Regional Supervisors of maintenance and operation details so they can devote their energies and professional training to the jobs they are uniquely qualified to do—planning and carrying out natural resource programs in their Regions.

Although the boundaries of the new regions are firm, the headquarters have not been definitely selected in all Regions. Construction of headquarters will progress as rapidly as funds are made available from the Capital Construction Fund. Fortunately, existing district offices can be used during the transition period. We are fortunate, too, in having qualified, trained, career men available for the new posts, so programs under the new administrative set-up can move forward without long delays.

The new reorganization, we are confident, provides a framework within which sound resource management programs can be co-ordinated and put into operation most effectively for the people of the State. We made every effort to avoid that chronic ailment of government—letting the attitudes and procedures of the past dominate the present. Furthermore, these Regions were drawn up not as static units but flexible enough to allow room for development.

Conservation Department field headquarters at Ray Brook

New York's Trout Stocking Policy

Some Comments on an Always Lively Topic

by Dr. C. W. Greene, Chief, Bureau of Fish, N.Y.S. Conservation Department

IN the April-May, 1950 issue of THE CONSERVATIONIST an article entitled, "Stocking for Production," summarized the Department's objectives and policies regarding fish stocking at that time. Our general management objective—the highest possible sustained yield of the desired species—expressed in part at that time, remains valid. Some evolution in our understanding of management procedures has occurred since then, however, and occasional inquiries from fishermen beginning "Why don't you?" suggest that it's time to add a new installment on this subject. In particular, it seems desirable to comment on the basis of some of the procedures in use today.

Fish managers manipulate aquatic environments to maintain and make available the fish species viewed as best adapted to specific situations and most valuable to the general public, and to fishermen in particular; also to increase production of such species. As long as the great majority of trout fishermen prefer to catch fish with wild characteristics and to have a reasonable chance to hook into at least a few "good ones," say from a pound up, the primary requisite of trout management will be to maintain and improve the physical, chemical and biological quality of wild trout waters. Many and varied methods are used for such management and a balanced program is desirable. For present purposes we shall concern ourselves primarily with management of the biological environment.

Since man is the most important trout predator, regulation of the fisherman, himself, becomes a highly important part of trout management. Regulations ideally function directly toward this end by so balancing outgo with intake as to provide pressure of a fishable population at all times. "Fishable population" is subject to many shades of definition or interpretation, of course, but, as a minimum, should mean presence of sufficient catchable sized trout to provide potentially fair quality fishing to the average fisherman. In other words, the angler, should have confidence, given the proper environmental conditions, that he is not pitting his skill against a vacuum; that the fish are there; that it's up to him to catch them.

Other and varied types of biological controls or management are available, especially direct fish population manipulations to reduce competitive and predatory species or to add to the trout population by stocking. Adding artificially produced trout to waters where they will survive, grow and provide fishing is, indeed, the best established trout management method, and the one with the longest history. Comparatively speaking, the method has glamour—the trout look pretty going into the water. They are tangible reason for angler optimism. Because of all this it is particularly worth emphasis that stocking is *only one* of many productive management methods and that there are many situations in which stocking is an ineffective or at best an inefficient management tool.

Any given trout stream has a relatively constant and definitely limited capacity for rearing trout to catchable size. A very large percentage of New York's trout streams maintain a more than adequate production of young trout to satisfy this capacity. If hatchery produced fry or fingerlings are added to such situations it is illogical and fallacious to expect better angling to result and, in fact, it has been repeatedly demonstrated that it does *not* result. Moreover, such stocking is wasteful and harmful because of the undesirable competition to which the native trout are subjected.

It is more difficult to isolate and identify the factors limiting success of stocking catchable sized trout where fishermen may soon remove a considerable proportion of them, but a beginning toward understanding such limitations has been made. Census work to evaluate the success of such stocking is time-consuming. It provides a measure of the trout crop, but fails to explain the success of angling or lack of it. From recent limited work of this kind, however, there is evidence that over-capacity stocking, to compensate for "heavy fishing pressure," often fails in its objective.

There are obvious reasons to question the likelihood of success of maintaining excessive (over-capacity) numbers of trout in any situation for lengthy periods. Crowded trout, especially stocked trout, are vulnerable to predators. Further, crowding, by definition, indicates that the trout will be underfed and, consequently, less able to withstand the numerous stresses encountered in wild waters.

The capacity of a given water to maintain trout while growing them at a satisfactory rate appears, then, to be an important basic consideration in allotting the quantity of trout to be stocked therein. For the stocking of young trout, where rearing to catchable size must occur in the wild, the relationship between capacity and quantity of useful stocking is obvious and direct. In stocking catchable sized trout, the relationship still seems obvious but it is not necessarily direct because removal of them by fishermen in most of our waters begins immediately or soon after stocking. The rate and extent of removal is considerably influenced by the degree of fishing pressure.

In recognition of this factor of fishing pressure, catchable trout are stocked at a rate at or above capacity according to evaluation by our field biologists of the comparative intensity of fishing pressure on the stream under consideration. Streams receiving yearling trout are stocked at capacity if lightly fished and up to double normal capacity for the most heavily fished streams.

The propagation and stocking of trout in the streams, ponds and lakes of New York State is one of the largest, costliest and most complex programs conducted by the Conservation Department's Division of Fish and Game. As such, it merits and receives constant analysis and evaluation by fisheries biologists stationed in Albany and in the field, to the end that optimum benefits shall be derived by the angler, and in the knowledge that we are dealing with a dynamic science; that these management tools are ever subject to modification to reflect changes in environmental circumstances and advances in our knowledge of fisheries management. Only in this manner can we be assured of maximum return for investment and conscientious satisfaction that the job is being performed as best it can.

In this article, Dr. C. W. Greene, Chief of the Department's Bureau of Fish, reviews the factors which guide this program today, and suggests means by which further improvement can be made.—Editor

Both carrying capacities and comparative fishing pressure upon which stocking recommendations are based are estimates. The factors upon which carrying capacities are estimated have been carefully selected and quantitative data involved have been worked out on the basis of extensive sampling. For streams, fish population sampling in sections of fifteen New York streams provided the basis for estimating the average carrying capacity of a unit area and of the normal range of variation. For a given stream, the stocking rate to be applied is then calculated by evaluation of four factors considered to be most critical in determining the comparative ability of a stream to maintain and grow stocked trout. These factors are: (1) Quantity of wild trout fingerlings present; (2) quantity of non-trout species present; (3) evaluation of riff-pool relationship, cover and shelter; and (4) evaluation of forage and soil type (fertility).

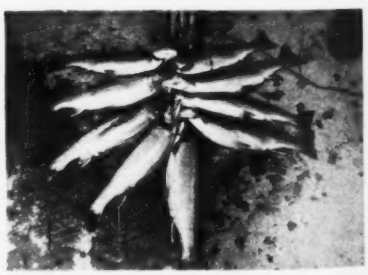
A stream to be stocked with catchable sized trout is placed in one of four classifications relative to fishing pressure. It is believed that classification is quite accurate within these relatively broad limits. The desirability of obtaining a more specific basis of comparison is recognized, however, and an attempt is being made to accomplish this with the assistance of sample fisherman counts on selected streams by airplane as well as by other methods.

Obviously, fishing pressure per unit area of trout stream varies considerably beyond the 1 to 2 ratio. The normal, immediate reaction to this fact is that stocking rates for catchable sized trout should be more flexible in order to bear a more direct relationship to fishing pressure. Recent census work indicates, however, that harvesting of trout on some of our heavily fished, high quality streams is actually very low, suggesting that the streams are being overstocked or that some other unknown reason or reasons for poor utilization exists.

It is clear that the above description of our basis for trout stocking recommendations relates primarily to stream stocking. A similar method is used to formulate lake and pond stocking recommendations, but information on trout carrying capacities for these waters is comparatively limited. The base level used for calculating stocking rates for these waters has, therefore, been derived primarily from records of results in specific instances in which at least rough correlations between stocking rates and success of survival and growth could be made. The detailed investigations carried on at Stillwater Pond, Putnam County, contributed useful information.

It seems obvious that no tabular arrangement of factors can include all the details influencing the success of a trout stocking program. Neither could a field force of reasonable size provide all the up-to-the-minute details which influence planting success. When planting time comes certain assumptions are made, such as: That the hatchery product is of satisfactory quality and is delivered to the stream in good condition; that weather and water conditions are tolerable; that fish population conditions have remained tolerable; that timing with respect to availability of food organisms is favorable; and, last but not least, that the trout will be planted with reasonable care. These are matters of concern relative to planting success and the success of fishing which may result, but they cannot be included in the quantitative calculation of stocking allotments.

A brief comment with respect to pro-



A catch of Stillwater Pond trout

Trout fishermen—Stillwater Pond

cedures of distribution and planting may be appropriate. In early hatchery practice, fish were shipped to applicants for them to plant as they saw fit. Today, much of the planting is done by volunteer help, principally members of fish and game clubs, co-operating with the Department. In general, these individuals do a fine, conscientious job.

Nevertheless, a good many fishermen are of the opinion that Department personnel should carry out the job of fish planting in order to achieve the best, most uniformly careful job of planting, including attainment of good "scattering" of the fish, generally considered to be desirable. Department personnel have been in general agreement with this opinion for some time. Adequate implementation, however, would entail some additional cost and, further, there has neither been convincing evidence of the high priority need (relative to other projects) to undertake this operation, nor has the Department been well organized or staffed to undertake it. As a part of the functional planning involved in the current Regional reorganization, the handling of fish distribution and planting is being reappraised.

In brief, then, the trout stocking policy and stocking recommendations for New York waters are based upon unit area carrying capacities of the waters stocked. For young trout, requiring substantial growth in wild waters to attain catchable size, we believe this basis is technically sound and directly applicable. For stocking of catchable sized trout, fishing pressure is an important consideration, but recommendations are, and we believe should be, tied to carrying capacity.

Finally, all stocking tables and stocking systems in use today appear to be imperfect because it is impracticable if not impossible to include in them all factors pertinent to successful planting. In our opinion the system used here in New York should be, and will be, revised and improved from time to time. Meanwhile, we believe the present system provides a uniformly sound basis for fair distribution of fish in State waters.

Reforestation in the Old Days

DURING the years 1912-1916, the State planted about 5 million trees on Forest Preserve land in the vicinity of Paul Smith's, Saranac Lake and Lake Placid. The trees were raised from the seed in a garden located in the hamlet of Lake Clear, lying between the highway and the railroad. These seed beds were fertilized with horse manure shipped from a livery stable in Montreal and loaded in gondola railroad cars which were unloaded at Lake Clear Junction. It smelled to Heaven! One fine spring day, when the New York train stopped to discharge passengers bound for Saranac Lake and Lake Placid, I was approached by a well dressed man with a worried look. He had apparently come to the Adirondacks for the first time to enjoy the scenery and the aroma of the Great North Woods. "Pardon me," he said. "Do I smell balsam?"

Late in April, just as soon as the frost was gone from the seed beds, the two-year-old seedlings were lifted with spading forks and set out in transplant beds. Some of these beds were located along the Lake Clear-Saranac Lake road just east of Lake Clear Junction and a bit further on at a place called Carley's, and also at the fish hatchery at Saranac Inn Station. Practically all the trees were kept in the transplant beds for two years so that they were four years from the seed and were from 10 to 18 inches high, depending largely on the species. The men, who worked in the nursery, were paid at the rate of 22 cents an hour and boarded themselves. If they lost 30 minutes due to a shower they lost 11 cents. If they were lucky and got in a full 60-hour week they boasted of the $13.20 they had earned. They were mostly young men from Tupper Lake, Saranac Lake and surrounding hamlets, but always there were transients—St. Regis Indians from the reservation at Hogansburg, and even ex-convicts fresh out of Dannemora Prison. It was a motley crew. There was a true Knight of the Road, called "Four-Track Red," who showed up every spring as regular as clockwork and entertained us with wild tales of his travels.

About the first of May, we would recruit tree-planting crews of about 30 men. These crews were maintained in tents located right on the planting area. The men were paid 15 cents per hour and worked 60 hours per week. The cook and the foreman were paid $2 per day, straight time, but the men lost time in case of rain or snow. There was no charge for their board. Everything had to be delivered to the camp by horses and it was an all-day trip by team from Lake Clear to the planting sites north and northeast of Paul Smith's. We bought native beef by the side, flour by the barrel, dry beans and peas by the bushel, etc. We had no refrigeration and no sanitation. We cut our own firewood and baked our own bread and pastry. Two of the best cooks I ever had were John and Ed Roark of Gabriels. I can remember John Roark sitting up most of the night in the cook tent to keep the bread dough from getting too chilled to rise properly and it was a common thing to have to break ice to wash for breakfast. But the food was always good and so were the appetites. I remember one spring when we got about 30 St. Regis Indians and the cook told me they ate almost a crate of eggs (30 dozen) for breakfast the first morning.

One October, we were camped at Slush Pond. The hunting season opened on a Sunday and a couple of the boys had rifles. A drive was made on the north slope of Jenkins Mountain, which is cleft by a narrow canyon with a funnel-like approach from the north. It happened that Ben Muncil, a guide from Paul Smith's, had a party in the vicinity. Hearing our drive coming (we had about 20 men driving) and knowing what was likely to happen, he posted his men at the south end of the pass and bagged three bucks and a bear. Our side didn't score.—ERNEST W. BLUE

Mopping up in the wake of the fire

When Forest Fires Threaten

CAN New York possibly have a repetition of the great fires of 1903-1908-1913—or Maine of the disastrous Bar Harbor fire of 1947? The answer cannot be an unqualified no. Yet it can be said quite honestly that the probability is decidedly less today.

The old days of "weak mind and strong back" methods of forest fire control have gone forever. Forest fire fighting has become a science. Important advances have been made in the realm of techniques and methods, detection has been speeded up, overhead personnel have been trained in organization and mechanized equipment such as power pumps, bulldozers, line plows, trucks and tank wagons are now commonplace. Radio, too, now has its place on the fire line and the use of helicopters and fixed-wing aircraft for reconnaissance, transport and the dropping of water and fire retardants is growing rapidly.

However, these are not enough in themselves to guarantee the ability of a single state to control a forest fire of catastrophic proportions. Various combinations of drought, temperature, flash fuels, lightning, wind, rugged topography and location together with the ever increasing use of the outdoors for recreation are intangibles which could breed a holocaust at any time. The Bar Harbor fire of 1947 pin pointed the fact that no single state could afford to have on a standby basis during times of extreme fire hazard sufficient trained personnel and equipment to contain one or more large fires occurring under adverse conditions.

This situation was of particular concern to the Northeastern area. Something new was needed and, as the result of conferences of the governors and other interested agencies, Congressional approval and ratification by New York and the six New England states of an Interstate Forest Fire Protection Compact was secured in 1949. These enactments created the Northeastern Forest Fire Protection Commission, a pioneer compact of its kind, as an action agency for mutual aid and forest fire personnel training for the several compacting states.

Its objective, as set forth in the legislation, was to promote effective prevention and control of forest fires in the Northeastern region of the United States and adjacent Canadian Provinces by the development of integrated state and regional forest fire fighting plans, by the maintenance of adequate forest fire fighting services, by provision for mutual aid in times of emergency and by the establishment of a central co-ordinating office.

The resulting mutual aid plan spells out in detail the procedure before, during and after an emergency. Subsequent to its preparation, it was realized by the Commission that if such aid was to be successful the forest fire fighting personnel in the several states must be trained to think and act alike in forest fire organization and in forest fire fighting methods and techniques. Since its establishment, the Commission has held annually for this purpose a training school for the personnel of the states concerned. The thirteenth session was held last February. As a result of this training, all of the fire fighting personnel from the seven states should, under the same conditions, think alike, plan alike and act alike in fighting any fire within their jurisdiction or to which they may be assigned.

Each year about forty top level fire control officers are thus trained and it is their responsibility on their return to their home states to train other members of their fire control bureaus. This, in brief, sums up the origin, duties and responsibilities of the Commission.

To date, there have been only three emergency instances where mutual aid in the form of both men and equipment have been dispatched from one or more of the compact states to assist another one. These have occurred in Maine and New Hampshire. But there have been several other occasions when equipment and men have been standing by on alert in their home state ready to go to the

by Arthur S. Hopkins,
Executive Secretary,
Northeastern Forest Fire
Protection Commission

The Maine fire—early stages

Corded wood in flames

aid of a sister state, if conditions worsened.

An example of this occurred in New York at the time of the Cold River fire in the 1950 blow-down. Fortunately, New York was able to hold this extremely dangerous fire to about 200 acres without assistance. New York's ability to do this was in a great part due to its preparation of initial action plans for the critical blow-down areas. The inspiration for these plans came from the Compact's training sessions.

Last September, a potentially dangerous fire occurred at Fourth Machias Lake in the State of Maine and is an excellent illustration of how a mutual aid operation functions in the Northeastern Forest Fire Protection Commission's area.

At the end of July, 1960 the Compact area's fire record for the year was exceptionally good and 1960 promised to beat all previous records. Only 2,046 fires had occurred and the burned over area had been held to 7,848 acres or .018 per cent of the 43 million acres under protection in the seven Compact states.

However, shortly after August 1st drought conditions existed in the northern portions of New York, Vermont, New Hampshire, and also in Maine where no rain of over one-half inch occurred during the entire month. The same situation existed in New Brunswick and the Provinces lying to the east. Maine had one large fire late in August, near Caribou, which was finally controlled without Compact help.

By September 1st both the fire danger and drought indexes had reached extremely high levels and long range weather forecasts gave no basis for optimism. The "build-up" of critical fire danger conditions had reached an ominously alarming point. Within the drought area all those concerned with forest fire suppression realized that "it could happen here"—and it did in Maine!

September 2, 1960

On Friday, September 2nd, a fire broke out near Princeton, Maine in recently cut-over lands which threatened to burn some 10,000 cords of piled pulpwood and over 1,000 acres of forest land. On that afternoon the Commission's Secretary, who acts as Dispatcher in all Compact mutual aid operations, was at his home looking forward to the long Labor Day week end and hoping that it would be a peaceful one. Not so! At 4:45 P.M. that day, Forest Commissioner Austin Wilkins of Maine called by 'phone to ask for help on the Princeton or Fourth Machias Lake fire which was not under control and which had already covered about 600 acres and had destroyed a large quantity of piled pulpwood. He had already committed 200

men, 80,000 feet of hose, 14 bull dozers and 9 tank trucks to the fire. Because of high winds, the fire was spotting ahead. Also, numerous "dry lightning" fires in other locations were occurring throughout the critical area, the control of which tied up substantial numbers of men and much equipment.

He requested the Dispatcher to place on alert for immediate dispatch when requested, 6 trained fire or sector bosses, 12 power pumps and 30,000 feet of hose. Here the Dispatcher took over. Because of the holiday, numerous 'phone calls were required to contact the right men. Here, from the Dispatcher's log, is the record of that day and the ones to follow:

5:10 P.M.—Completed call to Commissioner Edward W. Littlefield of New York. He called Solon Hyde, Superintendent of Forest Fire Control, reaching him at the Schaghticoke Fair by having him paged by a Deputy Sheriff. Abraham George, Jr., Hyde's assistant, was reached in Ithaca. Attempts to reach anyone in New Hampshire failed.

5:35 P.M.—Dispatcher reached Director Perry Merrill of Vermont, who alerted Fire Control Officer Nathan Dauchy.

5:40 P.M.—Littlefield reported that Hyde would call the Dispatcher's office later in the day.

6:00 P.M. — Dauchy of Vermont called offering 2 men, 1 pump and 2,000 feet of hose.

6:30 P.M. — Dick Diehl of New Hampshire made available 6 men 10,000 feet of hose and 4 pumps.

7:45 P.M.—Dispatcher reported to Maine that there were now on alert, 6 fire bosses, 5 pumps and 12,000 feet of hose, from New Hampshire and Vermont.

8:35 P.M.—Hyde of New York reported that he was canvassing the situation in New York; details later.

10:05 P.M.—Hyde reported as available 5 men, 5 pumps, and 10,000 feet of hose, with another 10,000 feet of hose to be dispatched later by air, if needed.

10:25 P.M.—Hyde reported Department airplane on alert with the approval of Deputy Commissioner J. Victor Skiff and Aviation Director Henry J. Evans for dispatch of additional 10,000 feet of hose.

September 4

9:00 A.M.—Called Austin Wilkins of Maine to report that his request in full was standing by on alert in New York, New Hampshire and Vermont. Wilkins requested immediate dispatch of 5 men, 6 pumps and 10,000 feet of hose.

9:30 A.M.—Hyde arrived Chatham, New York, for conference. Hurricane "Donna" now off the Leeward Islands, course still north-northeast.

10:11 A.M.—Wilkins requested immediate dispatch of 10,000 feet of hose and 6 pumps; cancelled request for men. Dispatcher called Hyde to arrange for dispatch of above by air from Saranac, New York.

10:25 A.M.—Hyde reported flying conditions unfavorable; arranging to send hose and pumps from the Catskill area by trucks this afternoon, the same amount to be held on alert at Saranac for later dispatch, if flying conditions improved. All pumps to be accompanied by nozzles, Siamese suction hose couplings, extra tanks and repair tools.

10:35 A.M.—Called Maine and reported above situation.

September 5

9:50 A.M.—George reported that pumps and 10,000 feet of hose had left the Catskill storehouse at 4 P.M. Sunday in two trucks driven by District Ranger Victor Schrader and Ranger Stanley Engel, should arrive early September 5th.

10:00 A.M.—Maine cancelled alert of equipment to be flown by air partly because of flying conditions.

10:10 A.M.—Wilkins reported fire situation as follows:

1. 35 days since last rain. 2. Lines around fire but numerous "spot" fires still occurring. 3. Weather forecast 1/10 of one inch of rain in next 5 days. Wind, northwest, 10-15 miles per hour. Very dry. Wilkins preparing proclamation for the Governor's signature, to close woods if conditions worsen.

10:40 A.M.—Wilkins called again, after receiving his morning report from the fire, to request immediate dispatch of 10,000 feet of hose and fire pumps to reach Augusta area on September 6th. These items dispatched from Concord, New Hampshire, by truck.

September 7

A.M.—Made report of fire to U.S. Forest Service, Region 7, Upper Darby, Pa.

September 8

10:25 A.M. — Called Commissioner Wilkins who reported as follows: 1. Princeton fire under control. 2. Numerous small dry lightning fires. 3. New Hampshire hose and pumps assigned to new fire starting evening of September 6th. 4. Entire state very dry. 5. May need more help unless rain comes. 6. Calling Board of Review for September 29th.

10:40 A.M.—To meet the possibility of further calls for aid from Maine, Dispatcher got in touch with Massachusetts, Rhode Island and Connecticut with the following results:

10:40 A.M.—Director Kenney of Massachusetts agreed to hold on alert 10,000-15,000 feet of hose.

11:15 A.M.—Edson of Rhode Island called; has 25,000 feet of hose on alert and 25,000 more feet available. He also reported smoke from Canadian fires in Providence and wind rising (Hurricane "Donna").

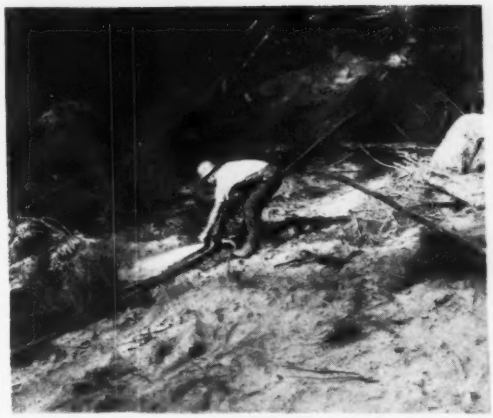
11:40 A.M.—Stocking of Connecticut reported 6 pumps and 10,000 feet of hose on alert.

11:45 A.M.—Reported additions to alert to Wilkins.

Totals now dispatched or on alert:

First stage pump at lakeside

Bulldozer at work clearing firelane



Adjusting hose connection

Canvas relay "tank"

107,000 feet of hose and 31 pumps.

September 9

7:45 A.M.—Wilkins reported New Hampshire has closed Coos County; that the U.S. Forest Service had closed the portion of the White Mountain National Forest in Coos County and will close the part in Maine, if requested.

Wilkins has made request of all timber and pulp companies to close private roads and campsites to public use over week end. Has asked the Fish and Game Department to have Game Protectors patrol highways, wooded areas and trails during the week end to warn travelers against fire danger. Also that he has informed State Civil Defense Agency of the situation but has not asked for help.

September 10

11:50 A.M.—Wilkins reports Governor will close the woods upon request. Wilkins has appealed on behalf of the Governor by radio to the public to exercise care when passing through the woodlands.

September 12

10:00 A.M.—Hurricane "Donna" expected to hit Cape Cod this P.M., moving north-northeast from off Norfolk, Va.; may or may not hit New England.

September 13

9:15 A.M.—Wilkins reports "Donna" passed through Maine last night leaving one to four inches of rain over the critical areas and requested all alerts be lifted. All states so informed. He is returning equipment sent by New York and New Hampshire. All fires now dead-out or under control.—Log closed.

What you have just read is only a small portion of the Dispatcher's complete log. It reflects only that portion of the fire suppression efforts at the co-operative, interstate level. It does not portray the details of the grimy, bone-weary on-the-ground jobs of fire supression, line building, hose laying, pumper operation, recruitment and feeding of personnel, radio operation and final mop-up. To thinking readers, however, we hope this chronicle will make vivid the realization of the power of one small match; of a single dropped cigarette; of an unextinguished camp fire to start a chain reaction often involving the Governor of the state, the State Fire Service, U.S. Forest Service, Civil Defense, the Fire Services of other states, lumber and pulp companies, State Police, Game Protectors, volunteer fire companies, summer camp owners and other forest users. And by no means last or least, the men on the fire line! Often hot, sweaty, hungry, and weary, they are the real heroes of this drama.

Compact Does Work

In the beginning there were many skeptics who said that the Compact would not work for lack of the power to enforce. Experience over the past eleven years has proven that no such power is needed. All requests for assistance on fires or in training have been met by the several Compact states with efficiency and speed far beyond the call of duty and with a whole hearted willingness truly worthy to be called magnificent.

During this period the Commission, created by joint agreement in response to a definite need, has established for its own use, uniform procedures for the suppression of both large and small fires. It has built up an interstate organization of high esprit de corps available to assist the states in forest fire emergencies and has brought about by instate training progressive improvement in the efficiency of the fire control job. Moreover, and without doubt most important of all, it has definitely proven that interstate co-operation in forest fire suppression *is* possible and *is* very much worthwhile.

White Pine Weevil

EASTERN white pine is one of New York's most important lumber trees. For reforestation purposes it will grow better on a wider range of sites and under a wider range of climatic zones found within the State than any other species. But, like all forest trees, white pine is subject to attack by diseases and insects from seed to maturity. The most important insect pest of the young sapling stage of growth is the white pine weevil, *Pissodes strobi* Peck, a native insect of the Northeast. The first record of the economic importance of this weevil was Dr. W. D. Peck's description in 1817.

The weevil attacks several species of conifers. The preferred host is white pine with Norway spruce a second choice. It is becoming an increasingly important insect pest of Scotch pine Christmas tree plantings.

The adult beetle ranges in color from light to medium brown with four indistinctly outlined white spots on the back of the wing covers (elytra). It is about one-quarter inch long including the snout protruding from the front of the head. The mouth parts are located at the terminal end of this snout. This is the only stage of the life cycle that is lived in the open. The other stages, egg, larva and pupa are found under the bark of injured or killed tree leaders.

The first signs of attack each year are tiny glistening droplets of resin exuding from feeding and egg laying punctures in the bark near the terminal top end of the previous season's leader growth. These punctures are made by the weevils emerging from hibernation in the pine duff and humus layer at the base of the tree.

After feeding and mating the female weevil begins egg laying. Recent research has shown that a certain percentage of the weevil population have already mated in the fall. Egg laying may start as early as mid-April in the southern counties of New York, and extend through June in the more northern counties. The female may visit more than one leader during the egg laying period and any single leader may have eggs deposited in it by several weevils. Generally not more than three eggs are laid in a single egg niche. The eggs hatch in seven to ten days.

The larvae feed between the inner bark and wood, boring downward towards the ground. The combined work of several of the white, legless grubs eventually causes a complete girdling of the stem. Two years of growth are always killed, the previous season's leader growth in which the eggs were laid and the current season's growth which often barely gets started. The dying and dead leaders are a second indication of weevil infestation. They can be seen during the late summer and fall (*figure 1*). Three or even four years of growth may be killed depending on how far down the tree stem the weevil grubs work before entering the pupal stage.

When the larva becomes full grown, it enters the pupal stage where transformation to the adult beetle takes place. A special cell, filled with coarse wood chips, is formed at the end of the larval feeding tunnel. The transformation takes place in this cell. This stage of the life cycle takes about ten days.

The new adult emerges from the pupal cell through a hole bored to the outside. This hole is about the size of a BB shot and indicates that the current season's brood of weevils has emerged. The new adults feed during the warm days of late summer and fall on the undamaged leaders and tips of the lateral branches. With the coming of colder weather they descend to the duff or humus layer directly under the tree. Most of the weevils will hibernate within an area close to the tree stem.

The damage the weevil causes, death of the leader growth, results in deformation of the tree stem. Frequently two of the surviving lateral branches may assume dominance thus forming a double bole tree. Repeated weeviling year after year produces very badly deformed tree stems or a type of brushy tree called a "cabbage tree" by foresters.

Natural Control

Extensive studies of the factors of natural control have been made. These include insect parasites and predators, animal predators and diseases. To date none of the natural factors have shown promise of producing satisfactory control even though they do cause considerable reduction in weevil populations. A large number of weevil larvae die within the leaders from competition for food and space and from "pitching out" by resin from the tree.

Applied Control

The New York Conservation Department has co-operated with the U. S. Forest Service since 1945 with aerial applications of insecticides. No fool-proof aerial application has yet been found. Weather unfavorable for flying either airplanes or helicopters at the critical time of weevil emergence, itself variable from year to year, has been the major reason for inconsistency so far. The most consistently effective aerial treatment has been helicopter application of two pounds of DDT in two gallons of oil solution per acre applied prior to weevil emergence. Spring applications of insecticides, no matter what type of equipment used, presents many unsurmountable problems due to inconsistencies of weather at this time of year.

Ground applications have been much more successful. Early work showed that concentrated sprays with lead arsenate applied with a compressed air sprayer gave good control. More recent workers have found that several of the newer organic chemicals can be substituted for the lead arsenate. The treatment is applied with a two- or three-gallon compressed air garden sprayer mounted on a pack board for ease in carrying (*figure 2*). A fine spray nozzle, delivering 2 to 3 gallons per hour is used. The nozzle is attached to a spray rod of aluminum quarter-inch tubing supported on a light bamboo pole. The rig can be made any length convenient to fit the average size of the trees to be treated. Some liquid measuring device, marked in fluid ounces, several one- and five-gallon cans for mixing the spray, and a fine mesh

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by John H. Risley[1] and Arthur R. Hastings[2]

screen strainer are also required. The insecticide recommended below can be purchased locally at an agricultural supply house or hardware store.

This type of application can be made from mid-September through the spring until weevil emergence starts, depending on the insecticide formulation selected. For fall and winter applications a one per cent lindane emulsion with Aroclor 5460 should be used. The latter material is an extender which will prolong the residual life of the lindane. It is available from the Monsanto Chemical Co., 2005 Concord Pike, Wilmington, Delaware at a nominal price. This material comes in a solid form and must be dissolved in xylene at the rate of 16 ounces per 16 fluid ounces (one pint) of xylene. The total solution will yield slightly more than 20 fluid ounces of Aroclor solution. Xylene is highly inflammable and must be used with caution.

The correct formulation for these fall and winter treatments uses 6.4 fluid ounces of 20 per cent emulsifiable lindane plus 1.7 fluid ounces of the Aroclor solution. These are mixed together in a container and sufficient water added to make one gallon of spray. Application of the spray is made to the leaders of the trees until the spray begins to drip off (run-off). Thorough coverage on all sides of the leader is essential.

Spring treatments using the same spray equipment can be made with a 2

Weeviled white pine leader

Back-pack spraying

per cent DDT emulsion spray applied just before weevil emergence in the spring. This spray is made by adding 10.2 fluid ounces of 25 per cent DDT emulsion concentrate to enough water to make a gallon of spray.

The cost of these treatments will vary somewhat with the insecticide used. Estimates of $4 to $8 per acre per treatment have been made depending on the tree height, tree spacing and terrain

A more recent development in white pine weevil control has been the promising test results obtained with a knapsack mist blower. This is a small mist blower which can be carried by one man. The results with a 6 per cent emulsifiable lindane plus Aroclor spring treatment has shown great promise. The advantage of the mist blower over the compressed air sprayer is the more rapid coverage of acreage that is possible. The treatments are aimed at the upper portions of the tree, spraying two rows at a time. Good control has been obtained with a total of 2 gallons of spray per acre. Two drawbacks of this type of treatment are the initial cost of the mist blower to the average landowner and the difficulties of spring applications.

Some very preliminary tests have been conducted using a larger model mist blower mounted in the back of a truck. Results of these tests are not available at the time of publication. The use of truck mounted equipment in plantations in future operations would require provision for roadways at the time of treatment.

Silvicultural Control

One of the first considerations in white pine weevil control should be made at the time of planting. Only the best growing sites for pine should be used. As one drives over the State highways it can be observed that pine is more severely damaged in some areas than others. The Conservation Department, in co-operation with the New York State Science Service, undertook a study of weevil attack in relation to soil types and other environmental factors. Results of the study indicated that poor internal soil drainage was an important factor affecting tree growth and weeviling; the greatest amount of stand damage was associated with soil mottling, hardpan, or both, within the first three feet of soil depth. Sites with this soil condition should be avoided when planting pine.

Another factor uncovered in these studies was that weevil attack began at a low level when trees were small (five feet or less) and reached a peak for any given plantation when the tree reached a height of 15 to 20 feet. After this point the attacks appear to steadily decline with increased tree height.

One must be observant of the white pine in his local area to see if it has been severely damaged by the weevil. If a high proportion of the trees show weevil damage it must be assumed that the area is in a high weevil hazard area. If so, white pine probably should not be planted except upon ideal sites unless repeated artificial control measures are planned. In areas which are not in a high weevil hazard area it may be possible to successfully grow white pine with no artificial control. The owner must remember that only 100 to 150 well distributed mature trees per acre are needed at harvest.

If an owner is lucky enough to have open land with a light covering of birch or poplar, white pine can be successfully under-planted and usually will develop satisfactorily with little or no weevil injury. Or a mixed conifer planting, except a mixture of white pine and Norway spruce, may be used.

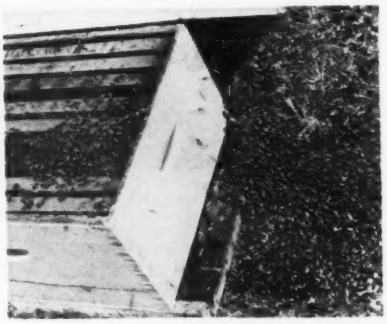
The landowner who now has a plantation or natural stand of white pine over 16 feet in height should examine it carefully. What appears to be a totally ruined stand may have enough intermediate or partially suppressed trees which are not weevilled to still produce the 100 to 150 mature trees at harvest if proper thinning operations are conducted to release these trees.

The Swarming of Honey Bees

by Dr. Roger A. Morse,
Assistant Professor of Apiculture,
Cornell University

Transferring swarm to hive

THE swarming of honey bees is one (and the more spectacular) phase of the reproductive process for this species of insect. Actually, it might be described as the leaving home phase in contrast to simply enlarging the old homestead. In the latter instance, the queen bee provides for expansion of the colony by laying more eggs. These hatch to produce additional worker and drone bees. Swarming, though, is quite a different approach. Here, the queen and about half the bees of the old colony pull up stakes and set out in a group (swarm) for a new home, leaving behind the other half of the original colony's bees, shortly to be joined by one or more new queens from soon-to-hatch cells left by the departing queen. When the young queens emerge in the parent hive, more swarms may also leave the hive. Usually, however, the first virgin queen which emerges kills the other potential queens by stinging while they are still in their cells and becomes the new mother of the hive. Thus, there are two or more colonies where there was originally only one.



Bees marching into new hive

This swarm picked a low shrub on which to swarm

Normal colonies of bees usually swarm only during May, June, and July (infrequently in August) and only when they are populous. The first visible step in the swarming process occurs when the queen lays a few eggs in especially designed cells. These are called queen cells and new queens develop in them. Shortly after these cells are developed the swarm leaves the hive. Some swarms have a new home selected in advance by scout bees before they actually leave the parent colony. Many do not select a new home in advance and these are the swarms which one occasionally finds on trees or bushes in the spring or summer.

Without swarming, colonies of honey bees could grow in size but there would be no new colonies to replace those which die or are in some way lost. A normal colony of honey bees is comprised of one queen, a few hundred to a thousand drones and several thousand worker bees. A very strong colony may contain as many as 75,000 workers. Workers are underdeveloped females, and incidently, all capable of stinging. Drones cannot sting and beekeepers' sons frequently take a few "pet" bees (drones) to school—much to the consternation of teachers and fellow students. (The drone is larger than the worker but smaller than a queen. The drone's eyes touch each other at the top of the head while the worker's eyes are well separated.)

Soon after a swarm settles and clusters on a tree or bush, scout bees leave to search for a new home. Experiments have been conducted in Germany to determine how bees select a new home. The scouts fly in all directions. When they have found potential homes, such as a hollow tree, a hole in a stone wall, an abandoned hive or perhaps a suitable cavity between the studs in a house, they return to the swarm and signify their discovery in a very definite manner by putting on a special dance. Each scout's

dance attracts other bees and informs them of the location of the prospective home. These bees in turn investigate the new site. The suitability of the new home is indicated by the enthusiasm with which the scout bees dance; the more active the dance, the more new scout bees go out to inspect the new home site.

The German reseachers report that it is especially interesting to watch a swarm when scout bees have found two home sites which appear equally suitable. Each time a new scout bee returns from the location, it also dances and soon there are many dancing bees in the swarm. The swarm will not leave its temporary location until all the bees have agreed on the new home site. It is not clear how this agreement is reached. It appears that the more intensive dancers attract the greater number of bees and slowly other dancers (scouts). These in turn inspect the new home and, upon returning to the hive, may change their dance and thereby agree to another location. Final selection may take more than one day.

Sometimes adverse weather may prevent the scouts from searching for a new home. If the bees are forced to remain in the open for four or five days they may construct new honey comb in that place. When bees swarm their wax glands are very well developed and they are ready to build new comb and a new home. When they build comb the queen may commence to lay eggs in it. Once brood is started the bees usually will continue to build a new home at that site despite the fact that it would be impossible for them to survive the winter in the open.

Capturing a Swarm

When the bees are clustered on a branch or small bush they may be captured easily and put into a hive. The method of placing the bees into the new home is to either raise the hive up to the level of the swarm and jar the bees into the hive with a quick shake, or the limb on which the swarm is located may be gently cut and the swarm either shaken into a hive on the ground or placed in front of the hive.

It is well to always use standard size beekeeping equipment when establishing a new colony. Not only does standard equipment have greater resale value, but when the need for additional equipment arises it is much simpler to purchase factory produced hives or standard secondhand hives rather than attempting to construct them. The bee hive most commonly used in the United States is referred to as the ten-frame Langstroth hive.

A new swarm of bees does not always remain where it is wanted. If a honey comb containing some brood (immature bees) is placed in the hive before the swarm is shaken into it, the bees will be more inclined to remain in their new home. Likewise, an old piece of comb or comb from which the honey has been extracted is more attractive to bees than is a new comb containing only beeswax comb starter which is called foundation.

The old saying—"a swarm in May is worth a load of hay, a swarm in June is worth a silver spoon, and a swarm in July isn't worth a fly"—is very true. It takes a considerable period of time for a new colony of honey bees to prepare the comb in the desired fashion and to gain sufficiently in strength to produce abundant honey for winter. A normal colony of honey bees in New York State is usually wintered in two supers (boxes) and requires about 60 pounds of honey for winter food. A swarm taken in most areas of the State during May or June should be able to store this much honey before winter. It would probably be necessary to feed a swarm captured after the first of July in order for it to survive the winter. It is usually not until the second year after the swarm is established that it produces any surplus honey.

In most areas in New York State a properly managed colony of honey bees should produce 50 to 100 pounds of honey which may be harvested. There are many flavors and colors of honey which can be produced, varying with the area in which the bees are kept and the time of year.

Mean Bees

Before bees leave the hive as a swarm, they gorge themselves with honey, enabling them to sustain themselves for several days or until they have had an opportunity to acquire a new home and furnish it with stores. Such bees are extremely gentle and very reluctant to sting. This might very well be true because it is extremely difficult for a honey bee with a full stomach to bend the tip of its abdomen into the stinging position. A stinging bee usually grasps the object being stung with its legs and the tip of the abdomen is forced into a position perpendicular to the object being stung. Consequently there is very little danger in manipulating a swarm which has recently emerged from a hive.

If, however, the weather is rainy and foraging for food is prevented and the swarm has been away from the hive for several days, the bees soon consume their food reserves. They are called a "dry swarm." Such bees are extremely vicious and some of the bad cases of stinging which have been reported have occurred under such circumstances. Fortunately, dry swarms are rare. Nevertheless, a person with little beekeeping experience would be well advised to have a smoker, veil and protective clothing available. The presence of an experienced beekeeper would be a definite asset. A dry swarm may be calmed by sprinkling it with sugar syrup which they consume.

Bee Diseases

Honey bees suffer from relatively few diseases and only one of these is serious. This is called American foulbrood *(Bacillus larvae)*. The disease affects only the young larvae in the hive. Fortunately, none of the bee diseases have any effect on man. This disease is caused by one variety of spore-forming bacteria. In its resting, or spore stage, the bacterium can remain alive for at least 35 and perhaps 50 or more years. Accordingly, it is extremely dangerous to use old beekeeping equipment or combs when one does not know the history of that equipment.

New York State has one of the best bee disease inspection programs in the United States. Money is appropriated by the New York State Legislature for bee inspection in order that a healthy beekeeping industry can be maintained for pollination and honey production in the State. Several states in the country have extremely poor inspection programs and the incidence of disease is so high that commercial beekeeping is unprofitable in certain areas, and hobby beekeeping, without considerable experience, is very difficult. In such areas there may also be a shortage of bees for the pollination of fruits and other crops. The incidence of disease in New York State is low and less than 1 per cent of the colonies in the State are affected at the present time. Persons interested in buying secondhand bee equipment should contact the State Apiary Inspector in the Department of Agriculture and Markets at Albany. Records are kept there on all the bees in the State and a certificate of health is required from that office, before bees or equipment are sold.

Correspondence Course in Beekeeping

The New York State College of Agriculture at Cornell University offers a correspondence course in beekeeping for beginning beekeepers. There is a $5 fee for this course which should be sent with the application. The course consists of 13 lessons, three practical exercises and a final examination. The course is so prepared that it is not necessary to own a colony of honey bees, although that is desirable. Persons interested in the course should write the Office of Apiculture, Department of Entomology, Cornell University, Ithaca, for more details.

Osmerus mordax—the Smelt

Some Big Questions and a Few Answers About a Little Fish

by Robert M. Roecker,
Conservation Biologist,
N. Y. S. Conservation
Department

THE smelt is a little fish, but inch for inch, we'll rate him high on the list of the most controversial species of the Great Lakes and of many of our colder inland waters. A diminutive "first cousin" of salmon and trout, the smelt can be considered a native of Lake Ontario and Lake Champlain, having adapted himself eons ago to the fresh-water habitats, following one-time pilgrimages up the St. Lawrence River from his ancestral home in the Atlantic.

There seems little doubt that smelt are here to stay, subject, undoubtedly, to ups and downs in population abundance—characterized in recent years by more up than down. And herein lie the seeds of controversy, for the smelt in our fresh-water lakes may be viewed in a wide spectrum—from miniature demons, preying upon eggs and fry of game fish, to the most delectable morsels ever to tease an epicure's palate.

Sportsmen in central and northern New York know these silvery little fish for their springtime spawning runs up streams tributary to the Finger Lakes and to Lakes Ontario and Erie—runs that signal the nightly advance of a lantern-lit army of men, women and children to splash happily with dip nets through the icy shallows. Lake trout fishermen know them too, for the smelt, along with alewives, are an important forage fish for the lakers in many of our deep water lakes. And they are no strangers to the commercial fishermen of the Great Lakes who, until recent years, considered them pretty much a trash fish, or at best, a waste of time because of the uncertainty of supply and market. But that picture is changing, as we shall see.

To begin with, however, let's trace the spread of this species into the upper Great Lakes and into many of our deeper and colder inland waters—courtesy of man's insatiable, and frequently misguided, compulsion to stock everything everywhere. The association of smelt and the upper Great Lakes appears to have begun as late as 1913 when this species was stocked as a hoped for shot in the arm for landlocked salmon in Crystal Lake, Michigan. From Crystal Lake they spread downstream into Lake Michigan and Green Bay, thence into Lakes Huron and Superior. They reached Lake Erie some years later and were first reported there at Vermilion, Ohio in 1936. The first recorded smelt run from Lake Erie was reported from a small stream in Norfolk County, Ontario in April, 1942. Subsequently, smelt runs have been recorded from streams along the Ohio, Pennsylvania, Ontario and New York shores of Lake Erie. Dipping by Department order has been permitted from 1945 to the present time.

Finger Lakes Smelt

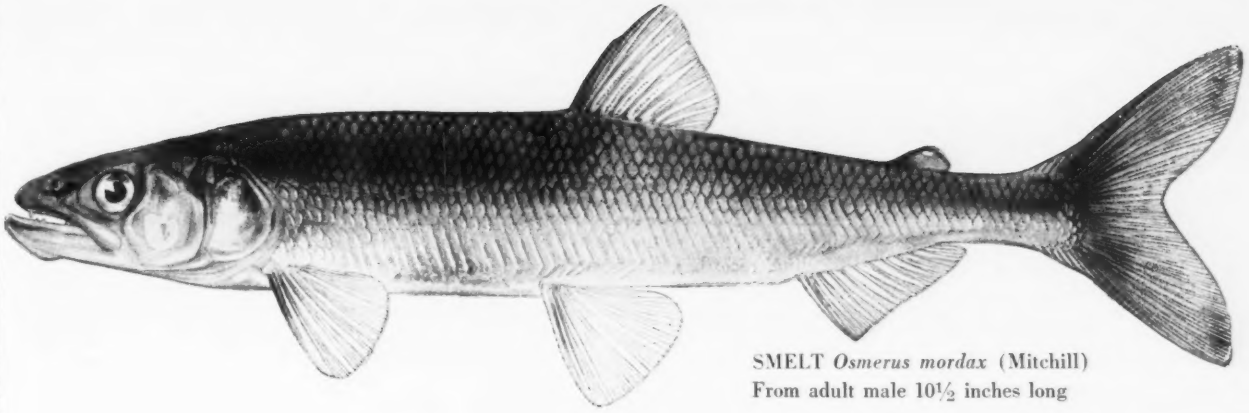
Smelt in the Finger Lakes region got their start from Conservation Department stocking during the period 1917 through 1925 and up to and including the year 1930. In Cayuga Lake smelt were sufficiently abundant by 1941 to permit their harvest as bait for angling. In 1942, dipping was authorized and this has continued to the present time. Smelt of Owasco Lake were introduced during the period 1917 through 1927. A self-maintaining population has been established there since the late 1930's, and dipping for bait and later for food was permitted by Department order from about 1940 through the present time.

Introduction of smelt in Skaneateles Lake was unsuccessful and smelt are either rare or absent today.

In Canandaigua Lake smelt were introduced as forage for lake trout in 1925, and so increased that dipping was permitted, beginning in 1934. The Canandaigua smelt population reached peak abundance during 1940 and 1941, to be followed by a crash decline in their population in 1943. After that the population began to build up again slowly. By 1935 lake trout growth and condition had improved markedly following the establishment of smelt and sportsmen reported that trout were no longer caught readily because of the abundance of food. It was felt that the abundant smelt might limit the survival of young trout both by competition and predation. Accordingly, special permits were issued permitting smelt netting. Department netting followed in 1936 and continued through the 1940-1941 smelt runs. By 1945 smelt had increased sufficiently to permit dipping which has continued intermittantly to the present. The smelt population appears to be stabilized at a sufficient level now to permit annual dipping in Canandaigua Lake and its tributaries.

Spawning Habits

Much is known of the spawning habits of smelt in our inland waters. In general the spawning migration of smelt into tributaries of the Finger Lakes and Great Lakes of New York begins in April, when the smelt leave the deeper lake waters and ascend tributary streams, usually after dark. Occasional daytime upstream movements have been recorded on dark days. The smelt always remain close to bottom and always head upstream, even when drifting downward. Usually the smelt, which move upstream to spawn on a given night, complete their spawning and return to the lake before daylight the following day. The run in a given stream is usually of relatively short duration—three weeks or less, with small numbers preceding and following the main run. Males predominate in the early part of a run, but the proportion of females increases until they comprise well over half of the run.



SMELT *Osmerus mordax* (Mitchill)
From adult male 10½ inches long

Larger, older smelt are more in evidence during the middle of the run, preceded and followed by younger fish. During the peak of the run, males usually predominate in the early part of the evening, followed by a higher proportion of females later in the evening.

Males are easily distinguished from females by both sight and touch. Males have pronounced ridges running lengthwise of the scales, making them look and feel rough, in contrast to the smooth scales of the females. The backs of the males are darker than those of the females, and generally, the females reach a larger size than males.

Spawning runs of smelt occur at temperatures between 35 and 59 degrees Fahrenheit. Spawning is done over rocky, gravelly or sandy bottom with one female usually accompanied by from one to a half-dozen males. Eggs are laid usually in a pocket or behind an obstruction out of the main current of the stream. In Lakes Erie, Ontario and Champlain the majority of the spawning population may not enter tributary streams, but spawn along the wave-washed shorelines. When deposited, smelt eggs are heavier than water and extremely adhesive. They attach and adhere to whatever object they touch first, remaining attached until hatching time, which varies with the temperature of the water during the several-week incubation period. The number of eggs spawned by a given female varies with its size—a 7.5-inch female may deposit 25,000 eggs; a 9.5-inch female from Lake Erie contained about 58,000 eggs. Smelt eggs are so small (approximately 30 placed end to end to an inch) that one quart will contain approximately 1½ million eggs.

Food of Smelt

Food of smelt varies with the water in which they are found as well as the size of the individual smelt. Smelt of all sizes feed on copepods, cladocera, rotifers, various insect larvae-fly larvae, Mayflies, caddis and small fresh-water shrimp *Mysis*, where these foods are available to them. Larger smelt will take smaller individuals of their own species, various minnow species and may take the fry and young of pan fish and game fish when these become available to them. Because of this fish-eating proclivity, biologists do not recommend the introduction of smelt in waters managed for other species of fish where predation by smelt on young game fish might prove detrimental to the maintenance of a high quality fishery. Studies by Province of Ontario biologists on smelt in Lake Erie indicate that smelt fed mainly on Mayflies almost continuously over a 24-hour period during the summer months.

Dipping Regulations

Regulations governing the taking of smelt are designed not so much to protect the standing crop of smelt as to distribute the catch among as many fishermen as possible. Where dipping is permitted and a catch limit imposed, overzealous dippers in strategic favored locations, at the mouth of a stream, for example, must relinquish their position to other fishermen when the liberal creel limit has been reached. A generous creel limit provides enough smelt for the personal use of the dipper and discourages unlimited harvest which is often followed by waste of a proportion of the catch.

Present Department regulations permit all persons entitled to take fish by angling to operate one scap or dip net of not over 14 inches in diameter, if in round form, or of not over 13 inches in square form. The mesh may be either metallic or non-metallic. Smelt taken by dip netting may not be sold by the taker or purchased by other persons.

In addition to waters where smelt are obtained primarily by dipping during the spawning season, smelt are harvested by angling in the waters of Lakes Erie and Champlain by ice fishermen in tremendous numbers. In Lake Champlain, where the smelt is best known locally by the name "ice-fish," the fishery is of long standing. Hundreds of ice shanties present on the lake each winter attest to the popularity of the sport.

Smelt as Bait Fish

Smelt are used as bait in many waters. They are an important food of lake trout and salmon and have been found in the stomachs of most New York game species and some pan fish where the species occur together in the same waters. Pickerel, northern pike, walleyes, bluepike, saugers, smallmouth bass, rock bass, lake-living brown and rainbow trout, ling and even perch are species which use smelt as forage. In Lake Erie, smelt are the principal food of blue pike and many other game and commercial fishes which have been studied intensively by Ontario biologists.

In New York, smelt may be taken as bait fish in any number, day or night, under an angling license by means of a seine of not over 36 square feet size. Smelt so taken cannot be sold or used for any purpose other than bait when taken in this manner.

The Lake Erie Smelt Fishery

Some idea of the magnitude of both the sport and commercial smelt harvest from Province of Ontario waters of Lake Erie can be obtained from the remarks of Ontario Lands and Forests Minister J. W. Spooner quoted in the February, 1961 *Sport Fishing Institute Bulletin*. In 1959, an annual spring survey of the smelt harvest on twenty known smelt fishing areas along the north shore of

(1) Based on information provided by personal communication from Ontario Department of Lands and Forests Research Biologist Robert G. Ferguson.

Lake Erie indicated that 62,000 anglers carried away 3 million pounds of smelt. In 1960, 68,000 anglers harvested over 5¼ million pounds of smelt from these same areas. Dip nets and seines are employed by sportsmen in harvesting this spawning-run smelt population. In addition to this harvest by sport fishermen, the 1960 commercial harvest has been estimated at over 10 million pounds and it is believed that 20 million pounds could have been taken with presently available gear and personnel if markets had been available.

Until very recently, the Lake Erie smelt fishery has been based on the harvest of spawning-run fish close to shore in the western basin, adjacent to Wheatley, Ontario. Pound nets and trap nets were fished close to shore during an approximately 6- to 8-week period during April and May. The town of Wheatley became the major processing center for the fishery. During the peak of the spawning season many tons of smelt may be bailed from each pound net daily and delivered to the processing plant.

The newest and probably most efficient gear now utilized for harvesting smelt throughout the year, whenever navigation is possible, consists of a modification of the Gulf of Mexico-type shrimp trawl. In general, the trawl is a large bag-like net dragged along the bottom by the towing vessel. It consists of a top and bottom seamed together at the outer edges. The top is supported by floats, the bottom weighted with leads. The forward edge of the bottom is protected from damage by contact with the bottom by heavy chafing gear. As the boat moves slowly forward, the pressure of the water against two large ironclad "doors" or spreaders, together with the combined action of floats and leads on the bottom of the trawl, open the net for fishing. The doors are attached by chains or heavy ropes to a bridle which is indirectly connected to winches on the vessel. These winches are used to raise and lower the net. The mesh size in the tail or narrowed bag portion of the net, called the "cod end," determines the size of fish taken and may be made selective for fish of different species. The most effective cod end size for Lake Erie smelt has proved to be from 1-1¾-inch mesh.

The year 1960 was the first in which large scale experimental trawling for smelt was carried out by a large number of vessels during the entire fishing season. In September and October, a total of ten trawlers (modified Lake Erie gill net tugs) operated out of Wheatley, Ontario. In December, 23 trawlers operated east of Wheatley in the Port Dover area. As of February, 1961, over 60 Province of Ontario vessels have been licensed to trawl for smelt. Present regulations permit each vessel to bring fish of other species in, not exceeding 10 per cent of the total daily poundage of smelt. This provision prevents waste.

In general, three, and occasionally four persons including the captain, operate vessels employed in trawling. Most vessels are 50 to 60 feet in length. Trawl size may be 50 to 65 feet. To locate the smelt and follow the schools during trawling, recording fathometers are used by many vessels in the fleet. The continuous written record *(see figure 1)* produced by this instrument can be correlated with the catch for a given time and location. This record aids in estimating probable future catches, and does away with the need to haul in the net before a full catch is made. There is communication by radio between vessels fitted with recording fathometers and those that are not, so the entire fleet is informed where to fish when the schools have been located. If the fathometer records shows a large-sized smelt school being sampled by the trawl, a 20-minute tow may be adequate to fill the net. When fishing is poor, it may take one or even two hours to fill the net. Catches vary from month to month throughout the year, and the location and depth of capture likewise varies with the seasons.

Experimental trawling by the Ontario research vessel, "Erie L.," yielded the following typical catches during 1960:

Period	*Daily catch*	*Catch per tow*
Early May	4,000 lbs.	1,000 lbs.
Late May	200-400 lbs.	200 lbs.
July	2,000 lbs.	600 lbs.
August	3,000 lbs.	800-900 lbs.
Early Sept.		2,000 lbs.
Late Sept.	5,000-6,000 lbs.	4,000 lbs.

In October, echo sounder records indicated a layer of smelt approximately six feet thick continuously for a distance of more than 200 miles. At this time, most smelt were found in 50- to 60-foot depth, with a small number ranging to 180-foot depth. Catches continued to be good throughout December and into January, 1961, at which time ice formation brings trawling operations to a halt. Commercial yields compared closely with yields of the experimental trawler.

Smelt obtained by trawling may show some injury. Very small mesh in the cod end and may bruise and crush some fish. The speed of trawling may affect the quality of the fish taken. Too fast trawling often causes internal damage.

In general, a quota system is in effect among Ontario smelt producers. This is set by the market and the facilities of the processor. At Wheatley, Ontario, Omstead Fisheries processed daily catches of 2,000-4,000 pounds per vessel for all vessels operating from that port during September and October, 1960.

In addition to permitting a fishery of extended duration each year, trawlers have an added advantage over other fish producers. Gill, trap and pound netters set large quantities of gear one or more days before the catch is removed. Storms may wreak havoc on these nets, and may prevent attendant vessels from reaching the nets to remove the catch without loss. Trawlers, on the other hand, leave no set nets subject to weather damage, and can pick and choose the days they fish. Following each tow of the trawl, smelt are brought aboard the trawler, boxed and iced. On arrival in port they are unloaded by conveyor, weighed and move along further conveyor belts to grading machines which can be set for a range of four sizes. Following grading they are machine-cleaned. A portion of the catch may be packaged fresh and the balance frozen before distribution to markets. Approximately 200 to 300 employees are involved in the April-May smelt harvest at Wheatley, Ontario. Waste products from smelt processing for human consumption are used in poultry feeding and on fur farms. During 1960 the average price paid fishermen at dockside was 3¢ to 4¢ per pound "in the round." Fresh dressed smelt averaged 12¢ per pound in February, 1961.

Most of the commercially harvested smelt from Lake Erie are two-year-old males and three-year-old females. The oldest Lake Erie smelt known was a six-year-old female; the oldest male was four years of age. A tremendous post-spawning mortality occurs each year, mainly among male smelt. During June, beaches in the vicinity of Point Pelee are often covered with windrows of dead smelt. Long Point beaches, farther east, show the largest numbers of dead smelt in late August or September.

Where do smelt live in Lake Erie throughout the year? According to Dr. Robert G. Ferguson, Ontario Department of Lands and Forests Research Biologist, smelt are segregated in schools of males or females prior to the April spawning migration. After spawning and with the warming up of lake temperatures by mid-June, smelt leave the warm surface waters and may be found from 50 to 100 or more feet depth, at temperatures of 55 degrees Fahrenheit or less. They remain at these depths until mid-September when cooling surface water permits them to enter the shallower portions of the lake. Since the deeper portion of Lake Erie occurs in the eastern basin, smelt predominate here during the warm summer months and return to the shallower western basin in fall, to remain there through the spawning season.

Oneida Lake Pancakes

by Dr. Norman J. Gillette,

Associate Professor of Botany, Syracuse University

Generations of anglers, fishing the shoals and around the islands of Oneida Lake in north central New York, are familiar with the odd, compacted discs that litter the lake's bottom in many areas. Dubbed Oneida Lake "pancakes," they are not infrequently hooked when bottom fishing and brought to the surface for puzzled examination. While they are widely known among the lake's fishermen, just what they are or why they are there has never been explained. The mystery, however, may be drawing near solution, as the accompanying article indicates.—Editor

ONEIDA LAKE, the largest of the lakes wholly within the State, lies in a somewhat spoon-shaped depression which deepens toward the eastern end. As the end of the last glacial period approached, melt waters of the glacier filled much of the Ontario Basin, forming Lake Iroquois, the outlet of which was to the east through the Mohawk and Hudson valleys. The old north shore line of this lake and its outlet bordered the north shore of the present Oneida Lake. When the glacier receded farther north, the outlet of Lake Iroquois was through the St. Lawrence Valley. This left the present Oneida Lake as a large pool in the former outlet.

The bottom of the present lake has much the same characteristic topography as does the surrounding territory. There are elevations in the lake resembling morainic hills, the crests of which form the shallows, small islands and shoals, especially near the center and toward the western end. One of these, Pancake Shoal, is located about 1.6 miles south of Constantia in the vicinity of Wantry and Long islands and Grassy Shoal.

Pancake Shoal receives its name from the numerous dark, disc-shaped concretions which have been found from time to time in its vicinity. These concretions are circular or elliptical and range in diameter from four to ten inches. They are of varying thickness, but mostly are between one-half and one inch thick. Often they are thinnest in the center and increase in thickness toward the periphery. An examination of the broken surface of the concretion reveals a type of layering suggestive of a rhythmic type of formation. Three different types of materials are optically visible on the broken surface: A metallic zone which is rather thin and layers of orange sediments interspersed among the dark brown layers. These latter two layers merge one into the other, but the metallic zone is fairly distinct from the other two and can be removed with a little patience. A cursory chemical analysis made by Dr. Joseph Neal of the Department of Chemistry at Syracuse University, indicates that they all contain iron and manganese. The metallic zone is about 35 per cent iron and 8 per cent manganese; the orange layer is 15 per cent iron and 12 per cent manganese and the dark material has 10 per cent iron and 27 per cent manganese.

Grossly, these concretions bear a resemblance to certain other deposits found in bodies of water. In the Bahamas, members of the blue-green algae are responsible for building up reefs in both saltwater and in the inland lakes. In these instances the mucilaginous matrix of the algae is responsible for capturing sand and silt particles during recurrent periods of flooding. No remains of any algal filaments could be identified in the Oneida Lake "pancakes." In several of the central New York lakes, especially those rich in lime, "water biscuits" may be built up around submerged twigs or similar materials. When the lime is removed from these "biscuits" with dilute hydrochloric acid some of the algal filaments usually remain. However, these Oneida Lake "pancakes" have too little lime in them to react with hydrochloric acid. Sea bottom nodules ranging from one to nine inches in diameter have been brought up from both the Atlantic and the Pacific ocean floors. These, upon chemical analysis, are over 30 per cent manganese. In cross section these display thin onion-like layers, indicating that they had been added to gradually over long periods of time. These concretions usually form around something as a nucleus and the manganese in these is believed to have entered the sea principally from rivers or from springs in the ocean floor.

When a portion of an Oneida Lake "pancake" was pulverized and examined under the microscope, it was possible to recognize bacterial cells. Some of these bacteria were cultured and they demonstrated an ability to precipitate iron out of an artificial medium, although several characteristics of these bacteria were not those of typical iron bacteria. A more detailed study of these bacteria is being made in the Department of Bacteriology and Botany at Syracuse University.

It has been demonstrated that microorganisms in general, and bacteria in particular, are instrumental in the deposition of iron and manganese. It has also been demonstrated that bacteria are much more abundant in the bottom muds of lakes than they are in the overlying waters. At least some of these bacteria do deposit iron by decomposing organic compounds containing iron by changing the acidity and the oxygen supply of the water or mud. By producing oxygen, algae may also cause the precipitation of ferric iron. In many environments iron and manganese are deposited together and most of the bacteria which precipitate iron will also precipitate manganese.

According to Pringsheim, an authority on the iron bacteria, such bacteria can be expected to occur where a low concentration of organic matter and a fair amount of oxygen are present and where small quantities of iron and/or manganese are available. Such habitats for these iron bacteria include waters that are polluted with animal and waterfowl excrements making them rich in dissolved organic iron.

A number of questions regarding the nature of these "pancakes" remain unanswered. One of these pertains to the reason they are so abundant in their particular location. A second unanswered question regards the factors that control the size and shape of the "pancakes." A few facts do appear from their study. The similarity of these to other concretions in which microorganisms are known to have played a role in their formation strongly suggests that microorganisms are also involved here. The presence of iron in the concretions together with the isolation of iron bacteria from them is strong evidence that the microorganisms are bacteria. It is hoped that further study and inquiry may supply additional information.

Typical Oneida Lake "pancakes"

New York's Forest Seed Orchards

by Dr. F. U. Klaehn[1] and E. J. Eliason[2]

White spruce seed tree selection on Route 28N near Indian Lake

Young blue spruce graft with good cone production

Forestry student "hunting" scion material

HAVE you ever driven through the lower Hudson Valley or along western New York's lake shores during the soft-aired month of May? You should! Thousands of New Yorkers make it an annual pilgrimage—recapturing, year after year, the pervading sweetness, the eye-filling beauty of fruit trees in bloom. Sweeping across the lake plains, climbing the gentle slopes of the river valley are vast cloaks of flowers—the distinctive pink of peach blossoms, the fragile white and pink of apple, the snowy banks of flowering cherries, the waxen white of pear.

These are the orchards, thousands upon thousands of acres of orchards, that place New York as an important fruit producing state. Probably you knew this, but did you know that in extension of the idea of growing fruits in orchards, New York, this year, will have the first forest tree seed orchard in northeastern United States?

The idea of growing forest fruits or cones in orchard plantations was developed in Europe shortly before World War II. Since then hundreds of acres of orchards with pines or spruces or larches and other trees have been planted with the objective of producing genetically superior seed for reforestation and tree planting purposes. In this country forest seed orchards were first established in the South. Pine orchards exist in Florida, Georgia, South and North Carolina and other southern states where large tree planting programs make this method

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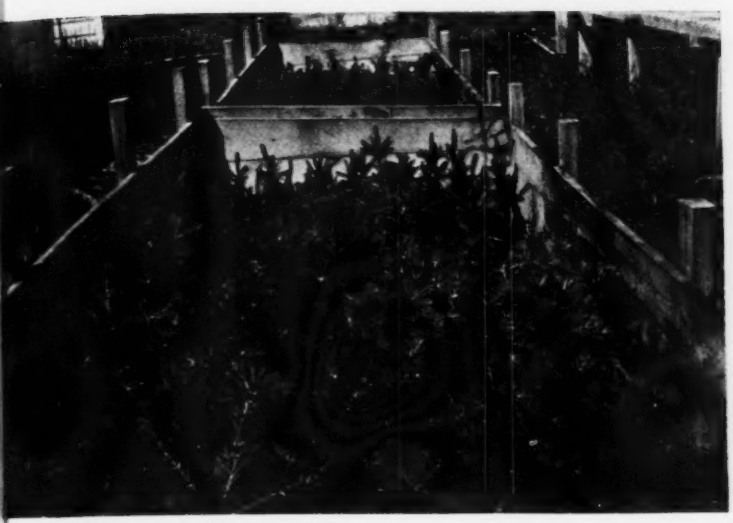
(2) Superintendent of Tree Nurseries, New York State Conservation Department.

economically very important. Now, New York State has its own seed orchard program, an important objective of which is to meet future seed needs in the State.

Annually, the State-owned forest nurseries produce 40 million seedlings of species such as white pine (4 million), Scotch pine (6 million), red pine (4.8 million), white spruce (12 million), Norway spruce (8 million), larch (4 million) and other species (1.2 million). To have these 40 million seedlings available, more than 4,000 pounds of seed are required each year in the seed beds. Since our forest trees normally produce seeds at infrequent intervals (see CONSERVATIONIST, Vol. 14, No. 5, April-May, 1960) a large amount of seed has to be kept on hand.



Storage bed of young grafts

To date, all seed used in New York State has been collected without special regard toward genetically superior seed sources. These sources, in matter of fact, have not been available heretofore.

In addition to production of superior quality seed, the collection of seed by nurserymen will be greatly facilitated. The very height of seed bearing forest trees now used imposes a real handicap. In seed orchards, however, the harvest of cones or fruits from superior grafted trees is facilitated considerably by the strongly reduced heights of orchard trees. They are kept small by pruning and artificial crown shaping which, done the right way, favors flower and fruit setting. Flowering and fruit production can also be increased by other stimulation methods such as root pruning, the application of fertilizers, etc. This means that seed production in orchards can be controlled much more efficiently than in natural forest stands *(figure 1)*.

This new program got its start in the fall of 1959, when members of the New York Conservation Department, Bureau of Nurseries, and the College of Forestry, Department of Silviculture, started discussions concerning a co-operative seed orchard program for the State. By the end of March, 1960, general approval had been given by the administrations of both institutions. It was decided to start in 1960 with seed orchards of the following forest tree species: White pine, Scotch pine, white spruce and two foreign larch tree species (European and Japanese which are more valuable for forestry purposes than our native tamarack, which is also a larch). Other species such as Norway spruce and red pine will be included in the expanded program of 1961.

The first step in such a seed orchard program is the selection of suitable parent trees; i.e., trees of high qualities of the desired species. These must be found in the forests of New York State to insure that they are adapted to our growing conditions.

Our white pine selections were concentrated in the Adirondack Mountains where old, straight and healthy white pines can be found and used as future parents of our nursery stock. Scotch pine trees were selected from stands where the trees exhibited a dark green winter coloration and superior crown forms. This species is grown extensively for Christmas tree purposes and these qualities are, therefore, important. White spruce, a species extensively planted in the State, was selected also from the Adirondack Mountains near Indian Lake and Newcomb, where this species occurs naturally. One of our white spruce selections *(figure 2)* can be seen growing adjacent to Route 28N, a few miles south of the Village of Indian Lake. Larches were selected from plantations established in various parts of the State. The specimens picked showed a clearly expressed superiority in growth characteristics.

In the first year of the program, a total of 41 selections (individual superior trees) were made, of which 15 are white pines, 12 white spruces, 8 Scotch pines and 6 European and Japanese larches. One white pine tree south of Wanakena has the following measurements: Age, approximately 250 years; height, 142 feet; diameter at breast height, 57 inches; length of branch-free bole, 78 feet. Most of the other white pine selections are about 130 feet tall and no tree is less than 30 inches diameter.

The second step of our program concerns the collection of scion material for vegetative propagation. Here we must keep in mind that it is necessary to obtain scion wood for grafting as high up in the tree crown as possible. Here the tree flowers, particularly the female flowers, are usually located. In many instances (Scotch pines, white spruces and larches) it was possible to climb the trees. The white pine scions, however, are too high and too difficult to reach with any kind of climbing equipment. These were collected by using a .30-06 Winchester rifle fitted with a telescope sight. *Figure 3* shows a forestry student "hunting" scion material.

Vegetative propagation is the third step in our program. Each of the selections was propagated vegetatively 25 to 60 times by grafting physiologically mature scions onto two- or three-year-old rootstocks. This grafting job was done in the spring of 1960 at Pack Demonstration Forest, Warrensburg, and in the fall of 1960 in the greenhouse of the College of Forestry at Syracuse. *Figure 4* shows the cold frames in which these young grafts are stored and kept under suitable conditions until they can be shipped to the State nurseries. To date, more than 2,500 grafts have been made for this program out of which more than 2,000 are growing. Thus, we have achieved an over-all "take" of more than 80 per cent.

Grafting was also done for testing purposes directly in the field. By testing is meant the determination of the inherent qualities of the trees selected and their ability to transmit those qualities into their progeny. Only material which is better than the average tree in the forest should and will be used for future seed production.

The College of Forestry has been responsible for the selection of the trees and their vegetative propagation. In May

of 1961, approximately 1,400 grafts will be delivered to the State nurseries. When the grafts are ready for planting (strong enough to withstand all kinds of hazards) the Conservation Department will plant them in suitable areas.

The establishment of the orchards in the field requires special attention. We must remember that our trees are cross-pollinators, which means that pollen grains from another tree must reach the female strobili to produce healthy and vigorous offspring. Accordingly, various grafts of a particular tree are distributed in the seed orchard in such a way that they are scattered over the entire area at approximately equal distances, and their neighbors always change.

Another consideration was of importance when the first area for the establishment of a white pine seed orchard was selected. To prevent pollination by unwanted pollen, areas had to be found where no other native white pines were growing within a certain distance. This provides necessary isolation from outside pollen sources and fertilization in the orchard takes place exclusively between the selected members. Wide spaced grafts flower and fruit much more productively than closely spaced grafts. A triangular spacing of 15 x 21 feet will be used.

By June, 1961, New York State will have its first white pine seed orchard of approximately 4.4 acres in the vicinity of Saratoga Springs, planted with 450 white pine grafts produced from 15 different selections. This orchard, as mentioned earlier, will be the first seed orchard in the whole northeast and will be the first eastern white pine orchard in the entire United States.

This report would be incomplete, however, if we did not mention the establishment of other orchards (white spruce, Scotch pine and larch orchards) which will follow in 1962. By that time, new selections will have been made and new grafts produced. To meet the entire seed needs of New York State in the future, approximately 400 acres of forest tree seed orchards with more than 30,000 grafts are required. A number of years are also necessary before the first orchards reach full productivity. After that time, however, better planting stock, needed more than ever before, will be available for New York.

These provisions, and this concept, assume major importance in terms of production of superior timber to meet the ever-growing demands for building and for wood products, as well as for the multiple values which our forests represent in natural resource needs of the future.

Some Lichens of New York

by Josiah L. Lowe,
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of Forestry
at Syracuse University

LICHENS, primitive, small and slow-growing plants, thrive in places inhospitable to other vegetation. They dominate a particular niche in nature where certain of their remarkable characteristics favor them, in spite of the aggressive struggle carried on by all plants for living space. On bare rock, barren soil, naked twigs and other raw and unsightly places they weave distinctive threads in that rich tapestry of plant growth that covers much of the world.

Lichens are the Success Twins of the Plant Kingdom. Each one is living evidence of an ancient yoke binding an individual fungus and an individual alga to each other. These, co-operating as partners, created a new individual of distinctive form and amazing new capacities. Lichens, unlike the less sturdy fungous or algal components, are probably the most hardy of all multicellular plants. They survive in the severest climates on earth, at such places as a few hundred miles from the South Pole and in blazing equatorial deserts. They play a unique role everywhere as pioneer plants that begin the salvage of scoured or impoverished earth. Lichens by fragmentation have evolved a highly successful method of vegetative reproduction of their dual entity. On the other hand individuality of the fungus and of the alga has been preserved. The fungous part has maintained its filamentous body form and its characteristic method of reproduction by seedlike bodies called spores, commonly produced in shallow cups called *apothecia*. The lichen alga is just like the free alga except that it reproduces by vegetative division only, never by the sexual method.

The lichen plant body is called the *thallus*, and it is composed of microscopic fungous threads and algal cells that are usually globular. The thallus may have a very simple structure, appearing much like a thin film of paint or dab of powder, or it may vary to a body of considerable size and intricate form, leafy or even stalked. The fungus dominates and gives the lichen its characteristic form, anchors it and envelopes the algal cells. These are usually scattered in a thin layer just underneath the outer mantle of fungous tissue, where the light necessary for food manufacture can reach them. In a few forms of the jelly lichens, the alga predominates and gives shape to the plant body.

Reproduction may be an individual matter, or a joint affair. The fungous portion may produce minute spores which are ejected in vast numbers from the apothecia. These, carried by the wind perhaps long distances, germinate in moist places and grow into the characteristic threads. To produce a lichen, the thread must encounter and establish an association with the right type of algal cell. This biological hazard seems to be a minor threat to existence, as free algal cells of the right type are usually abundant. Fragmentation of the lichen body circumvents this danger and is a very successful method of reproduction in many species. The surface of the plant body may be broken by small to large pustules or may disintegrate over extensive areas, sometimes the whole surface of the lichen. The exposed tissue is powdery and is composed of fragments called *soredia* which may be blown great distances. These fragments, with the proper fungus and alga already in association, are able to reproduce the plant. Where soredia are abundant, apothecia tend to be rarely formed.

The interdependence of the two com-

ponents of a lichen is of uncertain status. The combination is considered by many to be an association advantageous to both partners. The fungus goes through its normal cycle of development but is wholly dependent on the alga for food. The alga gains some protection and its water supply is more assured, but the fungous demands for food appear, sometimes, to bring about the death of great numbers of algal cells within the lichen thallus.

Lichens are more conspicuous in cold climates and so, in New York, are much more likely to be noticed at higher elevations in the Adirondacks and Catskills. They occur, however, throughout the State in relatively uniform variety. They need only light and a stable anchoring place. Their special niche is the spot where other forms of plant life find uncongenial surroundings. A few even grow under water. Disturbance by human activity, such as the plow, trampling, industrial smoke and gases, are destructive; where lichens are abundant nature reigns relatively undisturbed.

The economic value of lichens varies with the locality and social conditions. In the Far North, a few species carpet the earth and serve as the principal food for caribou, musk ox and reindeer. Animals dependent on lichens must have enormous grazing areas, as growth of these plants is so slow that 20 to 30 years must elapse before a new harvest is ready. Tree lichens in New York are valuable as food for deer in times of heavy snow. Lichens burn with a fierce flame and, in forest fires, often cause spot fires when blown far ahead of the main blaze. Under primitive social conditions lichens are highly useful. Fine dyes can be made from them, but modern demand far outstrips the productive capacity of lichen growth. Other materials have replaced lichen dyes except for home-dyed wools such as "Harris tweeds." The lichen known as "Iceland moss" is used to make a jelly which serves as a base for soups and the biblical manna was probably made from a desert lichen. Rock tripes are a well-publicized emergency food for Arctic explorers. A number of species are still important in the perfume and cosmetic industry.

Lichens have unique biological importance as pioneer plants. They initiate the process of soil formation in places where no other plants can grow. They form a mantle of protective growth which stabilizes the remnants of soil, enables more to accumulate and adds organic matter directly by the death and decay of their own bodies. In time enough soil accumulates to support more exacting and more rapidly growing plants.

Stalked Lichens

The stalked lichens (often called fruticose lichens) are well-known because they are abundant and often grow in masses, because they show great diversity of form and color, and because many have economic value. They grow either erect, with a strong stem, or hang pendent from limbs or bark. The most widely known are the erect Cladonias or reindeer lichens, easily recognized by their hollow stems. The variety and intergradations of the species in this genus are bewildering. They have been a lifelong challenge to many students who have tried to work out a satisfactory classification of these plants. The reindeer moss (not a moss of course but a lichen), *Cladonia rangiferina*, well represents the group. It is three to six inches high, gray with a tint of brown, and with darker nodding tips. The woodland reindeer moss, *Cladonia sylvatica*, is similar in form but has a pure gray-green color. These two may occur in extensive areas and they are consequently the principal lichens eaten by animals. The red crest lichen, sometimes called "British soldiers," *Cladonia cristatella*, is a striking species, a favorite for terraria. The scarlet fruits on miniature forests of these plants sometimes impart a rosy hue to limited areas.

The majority of Cladonias have brown apothecia. Such plants include the goblet lichen, *Cladonia pyxidata*, an extremely common species with stalks about one-half inch high. The pagoda lichen, *Cladonia verticillata*, is easily recognized by its peculiar habit of proliferating from the center of successive cups, forming a tiered, airy structure. The powder horn lichen, *Cladonia coniocraea*, has a slender tapering stem with a powdery surface.

The Easter lichen, *Stereocaulon paschale*, appears at first glance to be a *Cladonia*, but there are marked differences. This plant has a strong, solid stem and usually grows firmly attached to rocks. It often forms conspicuous pads, as on the avalanche slopes of Mount Colden. The pink earth lichen, *Baeomyces roseus*, is a charming plant. The vegetative portion, the horizontal thallus, grows through the earth and binds it into a crust highly resistant to erosion. The short stout stalks are crowned with pale pink apothecia.

The beard lichens, species of *Usnea*, are gray in color and well represent the pendent forms. The elongated willowly species are difficult to distinguish from each other; the long beard lichen, *Usnea longissima*, has powdery areas on the stem near the point of attachment and another equally common species, the pitted beard lichen, *Usnea cavernosa*, has, instead, small pits in the same place. The flowering lichen, *Usnea florida*, has a very different habit, with short stiff stems and conspicuously fringed apothecia which resemble flowers. This species often grows luxuriantly in the tops of dead trees and is noticed only when the trees fall. Readily confused with *Usnea*, but differing in having a brown color, are the mane lichens, species of *Alectoria*. The oak moss, *Evernia prunastri*, a somewhat coarser plant with stiff, angular, and often powdery stems, is interesting because it is the source of a valuable base for perfumes.

Space does not permit an adequate account of numerous other species, although attractive and often locally numerous. The Iceland moss, *Cetraria islandica*, used for soups, is an upright plant abundant on the high peaks of the Adirondacks. Mixed with it may be seen the curious worm lichen, *Thamnolia vermicularis*, similar in shape to the powder horn lichen but larger, and ghostly white, as if dead. Short stiff plants, much like *Usnea* but with flattened stems, are twig lichens, species of *Ramalina*.

Leafy Lichens

In some places these (often called foliose lichens) are as abundant and conspicuous as the stalked forms. They tend, however, to grow somewhat isolated from each other in more humid, less frequently visited places. The variations in their form and structure are not so striking as in the stalked forms.

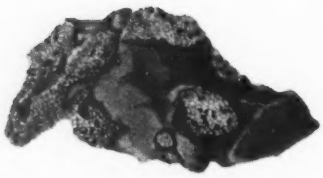
The wrinkled shield lichen, *Parmelia caperata*, is one of the few species conspicuous along roads. Its broad straw-colored thallus forms colorful patches on the bark of roadside trees. Cup-shaped apothecia rarely develop and it reproduces, apparently, by powdery or coralloid masses formed on the upper side. The boulder lichen, *Parmelia conspersa*, is similar in color but smaller. It grows ordinarily on rocks in places remote from roadsides and further differs by forming abundant apothecia. An Alpine relative, the ring lichen. *Parmelia centrifuga*, continues to grow radially after the center dies and falls away. One healthy specimen of this, on the summit of Mount Marcy, is fully two feet across. Considering that diameter growth of a similar lichen showed no measurable increase after 30 years, this particular plant must be one of New York's oldest inhabitants, whose age is to be counted in thousands of years rather than in centuries.

Many leafy lichens occur on bark. The lung lichen, *Sticta pulmonaria*, is a striking and easily identified plant.

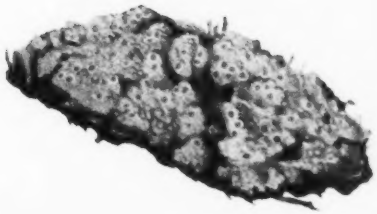
(Continued on page 26)

SOME LICHENS OF

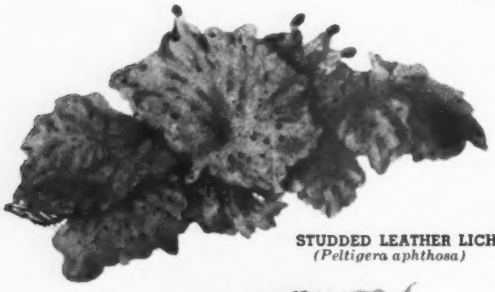
COMMON SCRIPT LICHEN
(Graphis scripta)—X10



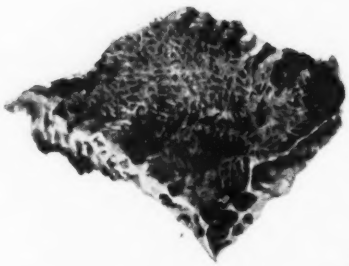
MAP LICHEN
(Rhizocarpon geographicum)



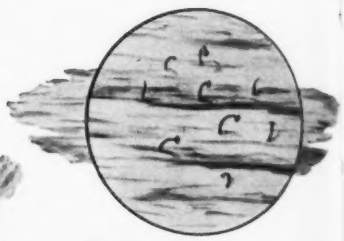
HEATH LICHEN
(Icmadophila ericetorum)



STUDDED LEATHER LICHEN
(Peltigera aphthosa)

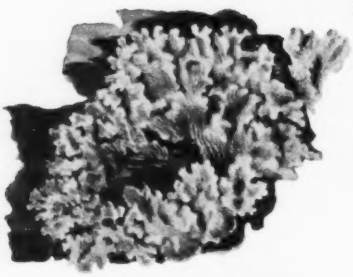


ORANGE STAR LICHEN
(Caloplaca elegans)

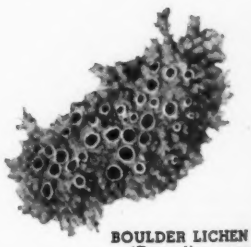


STUBBLE LICHEN
(Mycocalicium parietinum)—X10

SMOOTH ROCK TRIPE
(Gyrophora dillenii)



WRINKLED SHIELD LICHEN
(Parmelia caperata)



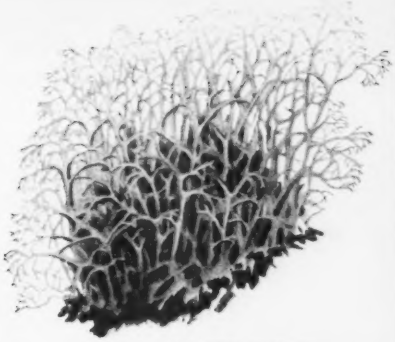
BOULDER LICHEN
(Parmelia conspersa)

PUFFED SHIELD LICHEN
(Parmelia physodes)

GRAY STAR LICHEN
(Physcia stellaris)

Wayne Peterson

OF NEW YORK



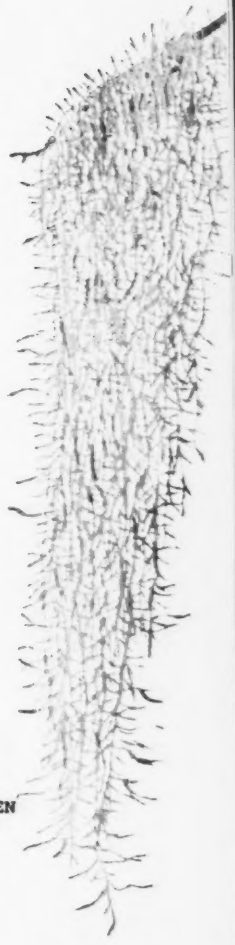
REINDEER "MOSS"
(Cladonia rangiferina)

RED CREST LICHEN
(Cladonia cristatella)

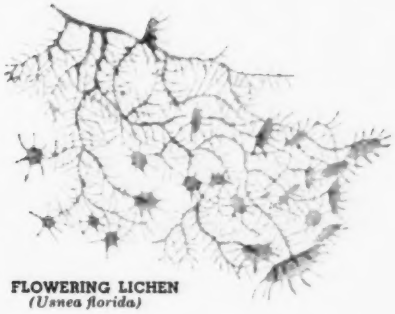
PINK EARTH LICHEN
(Baeomyces roseus)

PAGODA LICHEN
(Cladonia verticillata)

GOBLET LICHEN
(Cladonia pyxidata)

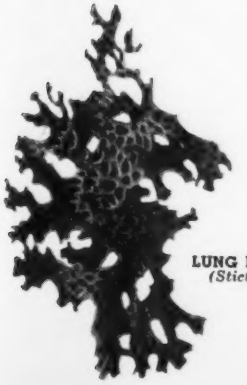


LONG BEARD LICHEN
(Usnea longissma)



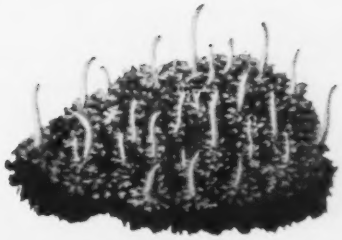
FLOWERING LICHEN
(Usnea florida)

BLISTERED ROCK TRIPE
(Umbilicaria pustulata)



LUNG LICHEN
(Sticta pulmonaria)

EASTER LICHEN
(Stereocaulon paschale)



POWDER HORN LICHEN
(Cladonia fimbriata)

(Continued from page 23)

Its coarsely pitted surface looks like lung tissue and for that reason it was long esteemed as a sovereign remedy for all respiratory troubles. For some unaccountable reason this lichen is a habitat for a wild yeast that pioneers employed to leaven sourdough bread. The puffed shield lichen, *Parmelia physodes*, is a gray species usually found on branches or slender trunks. The lobes of the thallus are inflated and often powdery underneath, but elsewhere the underside is black and smooth. The punctured lichen, *Parmelia pertusa*, is a variant of this with the thallus curiously pierced by small holes. The gray star lichen, *Physcia stellaris*, looks like a miniature *Parmelia*, and is easily recognized by its gray thallus with radiating slender lobes and abundant apothecia with a conspicuous bluish-gray surface.

Few leafy lichens can compete successfully with higher plants on soil or over mosses. The tooth lichens, the *Peltigeras*, occur in such places. The group is perhaps best represented by the studded leather lichen, *Peltigera aphthosa*, whose broad grayish lobes with scattered gray dots change remarkably on wetting to bright green with black dots. The underside is whitish with strong rootlike structures. This species forms apothecia rather rarely; other species in this genus often fruit abundantly at the margin which is rolled into fingerlike processes, with the brown cup surface on the convex upper side.

Rock forms, in addition to the boulder lichen, include the orange star lichen, *Caloplaca elegans*, whose bright orange or yellow-green color makes it a conspicuous plant. It is particularly likely to be on limestone rock, but may occur almost anywhere. A much more showy species, the shore lichen, *Teloschistes parietina*, has a broad thallus with a much lobed margin, and is restricted to areas near the ocean shore or near large lakes.

The leafy lichens mentioned above are attached over much or all of the undersurface. One group of these lichens, however, differs conspicuously in being attached by a more or less central stalk. These are the well-known rock tripes, ill-famed starvation food. The most conspicuous species is the smooth rock tripe, *Gyrophora dillenii*, which often grows in great abundance on steep rock cliffs. Its leathery lobes may reach a diameter of eight inches or more, and the underside is covered with a dense nap of stiff black hairs. These plants serve as traps for debris that wash down to them, and soil is built up on most unpromising sites. Ferns, shrubs and, eventually, trees grow here. Trees in such places, apparently springing out of the bare rock of vertical cliffs, often owe their establishment to the soil-collecting nature of rock tripes. The blistered rock tripe, *Umbilicaria pustulata*, is a smaller plant which grows in similar places. Its brown warty thallus with a pitted but hairless underside can scarcely be mistaken for any other lichen.

Crust Lichens

The crust lichens (often called crustose lichens), are frequently the most abundant type both as to number of plants and the number of species, but they are usually very inconspicuous. Their role in nature is not an obvious one; they are, however, true pioneer plants, able to establish themselves on almost anything that offers a secure support in adequate sunlight. They are found on bare rocks subject to the most severe buffeting our climate provides, growing for a short time after wetting, in that brief interval of favorable conditions before the plant dries enough to stop all activity, and tenaciously enduring extreme drought until the next wetting. Many crust lichens occur in more protected sites, but then they face a greater threat than drought from less hardy but much more rapidly growing plants which can easily overwhelm them.

The common script lichen, *Graphis scripta*, forms a whitish thallus on smooth bark. Its sunken apothecia appear as short, often branched or radiating black lines, resembling hieroglyphics, very different from the great majority of lichens. Another conspicuous crust species is the heath lichen, *Icmadophila ericetorum*, found in protected places, usually on rotten wood of prostrate logs. Its pale gray, granular thallus with pink stalkless fruit is unusually attractive, resembling rather closely the pink earth lichen. It is a remarkable exception to the usually long-lived lichens because its life span seems to be a summer season; it does not appear to persist over the winter.

Many crust lichens occur on rocks. A striking, easily recognized one is the map lichen, *Rhizocarpon geographicum*. Its bright yellow-green thallus is seated on a black layer which shows at the bottom of the numerous fissures and at the margin. Black apothecia are usually abundant at the intersections of these fissures.

Many crustose lichens are so minute that, unless searched out, they escape notice. One worth looking for is the slender stubble lichen, *Mycocalicium parietinum*. Examine closely whitened patches on tree trunks which have lost their bark. Here will be found, quite often, the tiny stalked apothecia which appear like brown-black microscopic pinheads, the stalks standing out vertically from the wood and so best seen in side view. As might be expected, stubble lichens are not often noted, although there are about 20 kinds in New York. An extremely common species long known to me but still unnamed, occurs on the stem of staghorn sumac just below the hairy young sumac stems. The apothecia are about one-fiftieth of an inch tall, black, and usually occur a few in a cluster. Stubble lichens are of special interest as they may be considered a connecting link between typical lichens and typical fungi. The fungus of many of these seems to be able to live without the algal partner for an indefinite length of time; eventually the fungous associates with algal cells and a lichen is formed.

Many crust lichens have a characteristic appearance and can be identified at sight, if named material is available for comparison. The majority of the species, however, require the use of a microscope for accurate identification, and so lie outside the scope of this treatment. The distribution of the crust species is far more poorly known than that of the other lichens, and the greatest contribution to lichen study in New York undoubtedly can be made in this group.

The stalked, leafy, and crust lichens are varied and colorful plants important in the vegetation of New York. Their biologic role is a unique one, essential to the recovery of severely burned or eroded areas. The 600 or more species that occur in the State will provide much pleasure to the nature student, and they challenge the scientist to spend a lifetime of rewarding study in their classification, physiology and ecology.

Further Reading on Lichens

Bruce Fink, *The Lichen Flora of the United States*, University of Michigan Press, 1935, reissued 1960.

Mason Hale, *Larger Lichens of Eastern North America*, Smithsonian Institution, in press.

G. G. Nearing, *The Lichen Book*.

A. Schneider, *A Text-Book of General Lichenology*, old but very useful.

A. L. Smith, *Lichens*, an exhaustive treatment.

J. W. Thomson, *An Illustrated Key to Common Lichens*, Audubon Nature Bulletin.

It should be pointed out that in the Conservation Department's own spraying operations for the control of destructive insects, every precaution is taken to avoid stream pollution and resultant injuries to fish such as those cited in Dr. Greeley's article. Where DDT is used, the concentration is at the light dosage of ½ pound per acre and direct application to trout streams or other bodies of water is meticulously avoided. In this way, any damage to acquatic life is reduced to an absolute minimum, while at the same time forests, and incidentally the fish and wildlife habitat are protected.—E. W. LITTLEFIELD, *Assistant Commissioner of Lands and Forests*

Farm and Home Poisoning of Fish

by Dr. John R. Greeley,
Chief Aquatic Biologist,
N.Y.S. Conservation Department

THE Mettowee River comes into Washington County from Vermont and trout thrive in it. But, on the morning of August 27, 1960 they were not doing so well. Residents of the Village of Granville through which this stream flows, peering from the bridge, saw many a fine trout together with innumerable suckers and minnows lying belly up. Suspecting pollution, they notified the Game Protector who took water samples and notified the Conservation Department's Pollution Unit, located at Scottsville. This unit, a Senior Analytical Chemist and a Conservation Biologist, although notably successful in fixing the responsibility for many fish kills due to pollution, ran up against insuperable difficulties in this case for there was no evident source of pollution and the water samples showed nothing to indicate what the pollutant was, nor who put it into the stream. Quite a number of similar situations in New York streams have occurred and others have been reported from several states. In each case the murderer of many fish struck suddenly, then disappeared. Unfortunately, it is a virtual certainty that he will strike again.

Maybe you are certain, at least, that you are not one such agent of destruction. But don't be too sure until you take a look around the house, garden shed or barn and see just how many poisons deadly to fish life you have and then consider—when you discard any of these —are you going to drop them in a nearby stream or where they can wash into it? If you clean up spray equipment will the lethal washings result in a fish kill? And how will you know what is a dangerous poison to aquatic life? Well, if it is poisonous at all, it may likely be dangerous to fish and if it is a modern insecticide, fungicide or herbicide the chances are it is especially deadly.

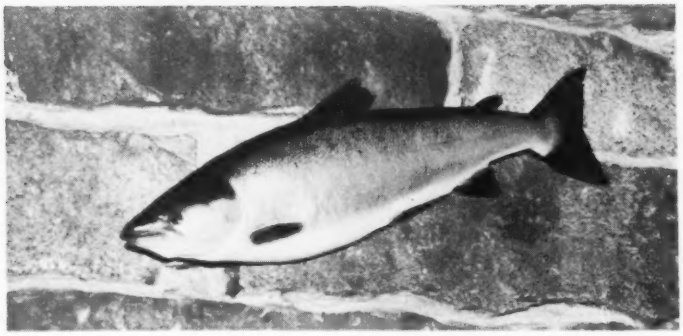
The rapid advancement of the chemical industry in the development of extremely poisonous chemicals, plus their widespread use in agriculture and for domestic purposes has brought about new dangers of water pollution. A few years ago, problems of pollution were generally restricted to areas where sewage or industrial wastes were involved. More recently, however, numerous kills of fish and aquatic life have occurred in waters where there were no effluents of this type. In several instances, disposal of highly poisonous chemicals or the cleaning of spray apparatus was responsible.

Prevention of this type of damage requires special care on the part of all users of highly toxic materials. These are too numerous to list completely and often have long chemical names. Just to mention a few: Chlordane, commonly used around the house or garden as an insecticide, is toxic to fish at 2/10ths of one part per million; cyanide has about the same toxicity; rotenone and dieldrin are lethal at 1/100th part per million; and toxaphene will kill fish at 4/1000ths (four thousandths) of a part per million (in other words 4 parts per billion).

The use of highly poisonous chemicals as insecticides, herbicides or for other purposes has grown and will no doubt continue to grow, but it requires special safeguards. Unused chemicals or wash water from cleaning containers or apparatus should not be discarded directly or indirectly into a stream. Dangerous chemicals should always be kept in a safe place and their use should be delegated only to responsible individuals who will observe all necessary precautions. These new poisons, useful tools for certain purposes, are far more dangerous than the old fashioned double-bitted axe.

Since these new poisons have developed faster than have the techniques and facilities for testing their effects on fish, it is not always possible to know how much damage they really can do, especially since some of them are virtually indestructible in water. On good trout streams or such specialized situations as hatchery water supplies, the potentiality of damage obviously is great.

While actual fish kills are a matter of obvious concern, the possibilities of slower action of poisons in causing delayed damage should also be considered. There are indications that some of the newer chemicals may cause a secondary poisoning. Insects killed by D.D.T. and eaten by fish have been found to be responsible for a delayed mortality. Endrin has been reported to accumulate in the liver of fish. Some forms of aquatic life are highly sensitive—endrin has been reported toxic to post-larval shrimp at one-half part per billion and lindane at 2 parts per billion. Such fragmentary information as is available at present is insufficient to pinpoint the full effects of all the various, well nigh indestructible new chemicals. Much more needs to be learned about the effects of chemicals on the food supply of fish. The main thing we can learn from such exploratory research is to be extra careful with such highly poisonous materials and those mentioned are only a few of the many in common use.



Plaster Casts of Fish

by Dr. Dwight A. Webster,
Cornell University

IT really isn't much of a trick to make an attractive plaster model of a trophy fish, given the fish, a little patience and a few readily obtainable materials. You can stop with the plaster cast finished off with an aerosol spray in some metallic finish, or if of artistic bent, try your hand at a natural finish with artists' oil paints.

The procedure described in detail is for a simple type mold suitable for the initial project. All the fish, including fins are cast in plaster. From here one can complicate the procedure by casting a fish with an open mouth and curved position, with more natural appearing plastic fins and with a glass eye. Space does not permit detailing these various procedures. The accompanying photographs will give some idea of these variations in technique that result in a replica of the original specimen. If initial explorations prove interesting, then an excellent book is available as a guide ("How To Make Fish Mounts," by Edward Migdalski; Ronald Press, N.Y.C.).

Care of the Specimen

Some care between time of capture and molding is necessary if the finished product is to be free from blemishes due to careless handling. The rules are three: Keep it cool, keep it clean and keep it moist. Decide on the top or side that will show when the cast is completed, and then keep that side facing up during transportation or storage. Wipe this side free of all dirt and debris and don't allow the fish to thrash around on the beach or boat deck. Lay your trophy low with a crack on the skull while it's still in the confines of the landing net. Before the natural coloration of your fish begins to fade, you can get a good color photograph of your catch—if you intend to finish off the cast in natural colors (*figure 1*). Then, wrap the fish loosely in a damp cloth, preferably one without a coarse texture for fine scaled specimens like trout. Cheesecloth is ideal if handy. Especially, don't allow the fins to dry out at any time. If you freeze the fish, keep the good side up and lay the fish flat on a board covered with wet cloth, or if you were fortunate enough to catch a fish that has to be folded to fit in the freezer, omit the board but take care to preserve one side and the fins from damage. If kept in storage watch out for "freezer burn" on the fins —best glaze the frozen specimen with water to build up a layer of ice that will keep the tissues from drying out. Wrap in foil or freezer paper.

Preparations for Molding

Coarse scaled specimens like bass or perch may only require wiping with a damp cloth prior to pouring the mold or negative piece. Some species are more slimy than others and the mucous must be removed and stabilized before a good mold can be made. In the absence of any special materials, scraping off the slime with a dull knife (go with the scales!) and allowing the skin to dry slightly before pouring the plaster may suffice. Slime removal from male salmon and trout in the spawning season may be particularly vexing and the most detailed molds may appear only after a couple molds are poured and removed. By then the mucous glands are exhausted and the scales will stand out in sharp relief. If you are home or in camp where vinegar is available, this with a little water will cut the existing slime and then a solution of powdered alum (from any drugstore) will tend to restrict further flow of mucous.

The next step is to arrange the fish in the form you wish the final cast to appear. For a large specimen or in the field, a sandy beach may be convenient. At home or if you intend to make a hobby of casting fish, a shallow rectangular box half filled with clean sand is the easiest way to handle the molding operation (*figure 2*). Wet the sand down, and if cheesecloth is available lay a wet double layer over the sand. This keeps sand from getting scattered around on the fish and sticking to the plaster mold —not essential but avoids a lot of unnecessary mess. Make a slight depression in the sand not quite half the depth of the fish. Put the fish in and arrange in a graceful curve. For a starter, keep the body of the fish in about the same plane. Now, work the sand up under the dorsal and anal fins so they are in the normal position, spreading them slightly. Avoid extending fins completely into stiff unnatural positions (*figure 3*). The pectoral fin should be secured close to the body by running a couple common pins through the leading edge of the fin diagonally back into the body. Do the same with the uppermost ventral or belly fin. This operation is important if these fins are to be cast simultaneously with the body because the latter forms the "backing" or base for the fins. Check the mouth and make certain it is closed or nearly so. Specimens may be cast with open mouths, but this is not recommended for the initial attempt. Mouth may be pinned shut if necessary.

A shallow dam may be arranged around the fish to retain the plaster around the fish. Aluminum strips (cut from type used for roofing) are ideal, but cardboard is adequate.

Mixing the Plaster

Most hardware stores carry a good grade of plaster of Paris in two- to ten-pound containers. Building supply firms are the cheapest source, however, if you are interested in turning out any quantity of casts. While plaster may be mixed in any convenient container, plastic wash basins or pails clean up better because of their flexibility *(figure 4)*.

A correct plaster-water mixture is important and the rule of thumb is to sift plaster into the water until the water won't take up any more and the plaster begins to "float." Or if you prefer, figure two pounds of plaster per quart of water. This is about right to mold a two-pound fish; five pounds will do a five-pounder (in 2½ quarts of water). Always add plaster to water, not the reverse. If you sift plaster in evenly, mixture will be smoother than if plaster is merely sprinkled in from the bag. Mixture may be smoothed by stirring *gently* with a large spoon, or by hand (most effective, but can be messy, so be careful). The objective, in either case, is to insure a smooth bubble-free mixture.

Allow the mixture to stand until a heavy but fluid consistency is attained. The setting time of plaster of Paris varies somewhat, but ten minutes seems to be common in commercial material. It is about right when the stuff can be poured, but will remain on the fish. Start at the tail and pour or ladle the plaster onto the fish, covering it entirely *(figure 5)*. Some plaster will run off and form a shelf around the fish. If plaster runs off in excessive amount, it may be scraped back up around the fish after it sets a bit more. The entire fish should be covered to a depth of ½ inch, thicker for larger specimens. If the fish is 15-20 pounds, or if the mold is to be transported under less than ideal conditions, reinforcement is desirable. After the first coat of plaster has set, lay on straps of any open weave cloth (burlap) saturated with plaster, and pour on a ¼-inch reinforcing layer of plaster.

Once plaster is poured, the mold must not be disturbed until setting is complete, usually two to three hours. Setting involves a chemical reaction which produces a small amount of heat. Mold feels cool after this reaction.

Removal of Specimen

Fish may be removed after several hours. Work fingers in around middle of mold and roll over carefully to expose "unpoured" half of fish *(figure 6)*. Slip a knife point carefully under an edge of the tail, lift up and work rest of body free and out of mold *(figure 7)*. For the simple mold described this should offer no special problems. If specimen was clean and plaster properly mixed, a detailed and faithful imprint of the fish should result. Sometimes a second or third mold made from the same side is better in detail because any mucous is removed with the first mold, particularly from the "seams" around the scales. If some mucous comes off on the inside of the mold, leave it and it will dry and curl up as the mold cures. Do not touch the inside of the mold until completely hardened. Scratches or loss of detail may result.

The mold is "cured" and ready for the next step when it is completely dry and no longer feels cool to touch. Drying over the furnace or in the sun hastens the process. Slow curing may result in a "moldy" mold so don't leave in a dark damp place to cure.

Preparations for Casting

A simple half mold will usually require little additional preparation prior to pouring the positive cast. Use a soft brush to clean out any sand or debris in the mold. If cheesecloth was not used over the sand, considerable sand will adhere to the ledge and this should be cleaned off as well as possible.

Now take some modeling clay and build a dam along the edge of the fin outlined on the shelf around the mold. The purpose of this is to allow more plaster to be poured here to strengthen the anal, dorsal and caudal fins. Slant the clay well over the fin so that the edge of the thicker base will not be conspicuous.

Next cut out the rough fin outline from hardware cloth, and form this so that it will fit more or less flush with the fin cast *(figure 8)*; this reinforcement should extend a couple inches into the body to provide secure attachment. Make outlines for all the fins molded on the ledge. If the paired fins were properly positioned against the body, no reinforcement is necessary for these.

Some means is necessary for attaching the finished model to the wall. The simplest is to twist a loop in each end of a length of heavy picture wire, embedding this in the cast in such a fashion that the loops stick out an inch or so six inches apart (more for larger fish). Loops are positioned so they won't show when the cast is hung. Some curved casts, or those in unusual positions don't hang so simply, and one should figure out some means for attachment prior to pouring the cast.

If a glass eye is to be used on your finished model, one of the best ways to get it properly embedded is to place it in the mold as it will appear in the final cast (convex side down) and pour plaster over it *(figure 9)*. A thin layer of clay or wax in the eye imprint in the mold will serve to secure the eye while the plaster is poured and fill in any space resulting from differences in the contour of the glass eye and the mold. In ordering an eye from a taxidermists' supply house, specify the diameter of the iris (measure this in your specimen) not the diameter of the eye socket.

When the mold has been poured a little thick in the region of the caudal peduncle (tail fin) it is usually a good notion to take a hack or keyhole saw and make one or two cuts nearly to the inside edge of the mold. This will weaken it sufficiently to lessen danger of cracking the cast when the mold is removed. Do this on either side of any fins that might also be affected in the same way.

Pouring the Cast

When all preparations noted in previous sections are completed, proceed as follows: Saturate the mold by pouring water into the cavity or dunking the entire mold into a tub or sink of water. When the bubbles stop, the mold is saturated. If you don't do this, the mold will draw the water from the freshly poured plaster of the cast.

Next a parting strip or separation surface must be provided, otherwise the molding and casting plaster will bond. Soap and water is one of the simplest and best materials for this. Brush a solution into the mold, making certain that all recesses are reached. The solution should be thin enough to sink in readily and not gum up the mold (or use a cap-full of liquid soap in a cup of water). Brush in plain water if any of the detail becomes obscured by excessive soap. Brush or wash in two or three coats. Now mix up a batch of plaster of Paris, following previous instructions. Be particularly careful about bubbles. While waiting for the mixture to thicken, inspect the inside of the mold and brush away any soap bubbles that may remain, using a dry brush. Arrange the mold so that the poured surface will be level and block the underside of the mold with rags or sponges (or nestle in sand) so it will remain stable. When the plaster thickens to proper consistency, pour it into the mold, checking to make sure all areas are covered. Submerge the fin reinforcements if these haven't already been left in position. Spoon plaster up onto any slightly elevated areas and into the fins to provide a layer ¼ to ½ inch thick. Don't bother to do this until plaster has thickened sufficiently to stay put. Finally add the wire or other means for hanging the mount. Let cast cure for several hours.

Figure 1—First step is a good color photograph if one intends to finish model in natural colors. Take pictures while fish is still alive or freshly killed to catch subtle tones

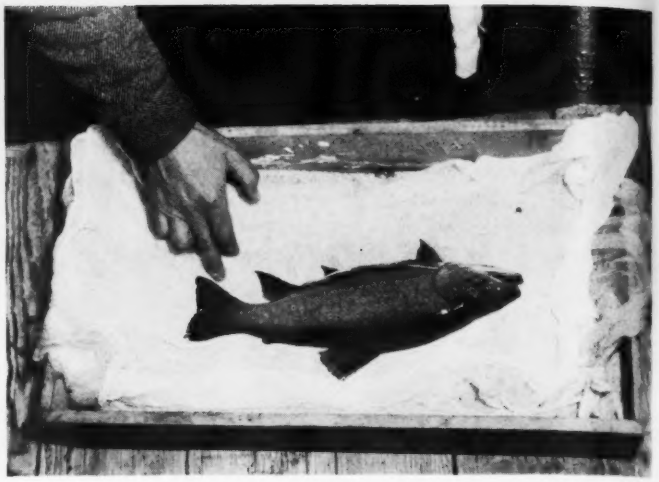


Figure 2—Male Adirondack brook trout is arranged in sand-filled box. In simplest type of plaster molding, mold can be poured now; specimen previously cleaned with vinegar and alum to remove mucus

Figure 5—Spooning on plaster, in larger specimens it is poured on. Pussy figures this desecrates good protein

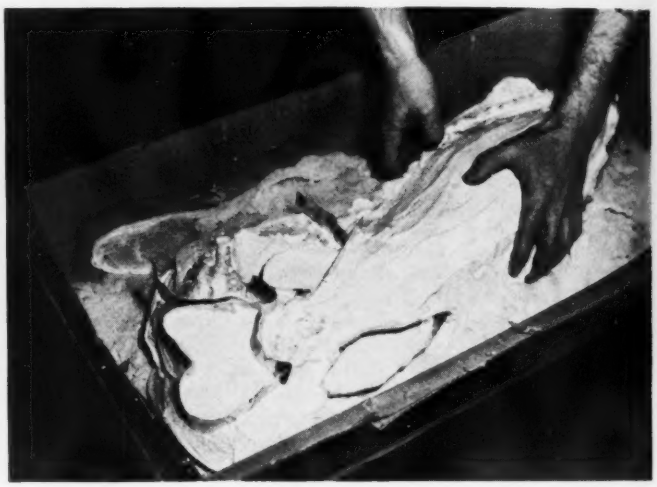


Figure 6—Reversing mold after plaster has set. Specimen is 7-pound northern pike from Cayuga Lake

Figure 9—Mold ready for pouring cast or positive impression. Note eye in position (upside down). Modeling plastic pressed into fin molds. Clay used to dam low areas

Figure 10—Breaking mold from cast, tail component of mold has separated along aluminum parting strip. This piece (with other fins) is baked in mold to harden plastic in position of attachment to cast

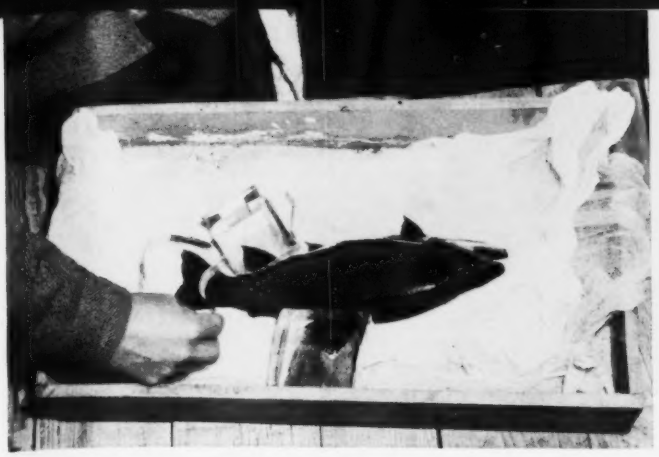


Figure 3—Arrangement of aluminum separators for fins. These will be cast in plastic in separate operation; helpful in adding to natural appearance

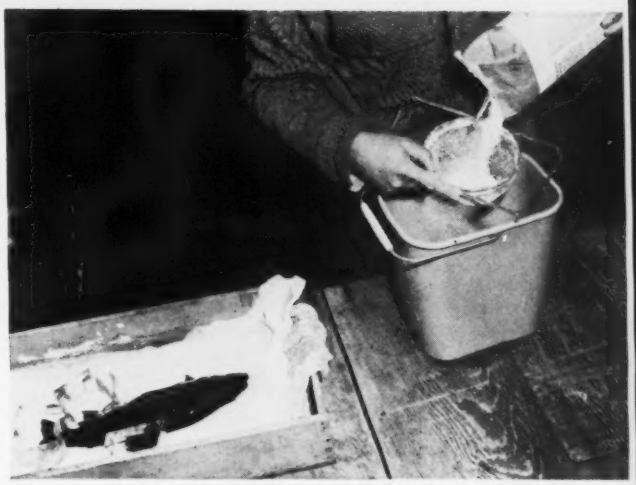


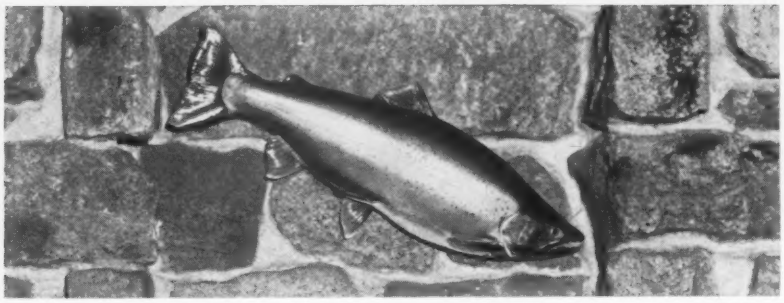
Figure 4—Sifting plaster of Paris

Figure 7—Removal of specimen usually presents no problem in a closed-mouth position. Open mouths are more complicated, require filling cavity with plaster first, then using separator when rest of mold is poured

Figure 8—Simpler method of reproducing fins in plaster requires reinforcement with hardware cloth. Clay "levee" around fin outline permits building up of thicker fins to minimize breakage

Figure 11—Attaching plastic fins to body mold with contact glue; later reinforced on back side with liquid metallic solder

Figure 12—Air brushing first of under colors to model of male land-locked salmon. Base aluminum spray was first applied to entire cast



Six-pound rainbow from Keuka Lake

Removal of Cast

Tapping the mold around the shelf will usually cause the mold to fracture and fall away from the cast if the mold is a simple one with no undercuts. A little special care may be used around the fins or caudal peduncle—support these from the underside, with one hand tap the shelf of the mold lightly until mold and cast separate *(figure 10)*.

Be careful about damaging the good side of the green cast, as it dents and scratches easily until completely cured. But for this reason, rough edges can best be pared off now with a heavy knife. Also bevel the back sides of the fins so that the unnatural thickening will be minimized. In casts of large fish this can be done sufficiently so that there is little impairment in natural appearance. Clean out any parts of the mold that may remain in the detail lines, particularly about the gill, nostrils, mouth, etc.

If a part of the cast breaks in removal, save the pieces, as most breaks can be satisfactorily repaired. Surface defects can also be patched later.

Set the cast aside in a safe place and allow to dry completely.

Finishing the Cast

Broken fins or chips may be glued back on when the cast is dry *(figure 11)*. Seams, bubble holes or other surface imperfections can be corrected with plaster water. Mix a thin solution of plaster and water (half a tennis ball is a good container as it can be inverted to remove hardened plaster). Using a fine soft brush, paint crack lines or defect with plaster water. Dry plaster will draw water and plaster from brush. Excess can be brushed away or modeled as required. Clean off the film of clay on the glass eye and trim any plaster surrounding the eye as needed.

When the damp places around repaired areas have dried, seal the surface of the cast by brushing on two or three coats of thin shellac (dilute standard 3 lb. cut about half). Be sure not to load the detail with excess shellac. The last coat of sealer can be sprayed on (using an aerosol lacquer sprayer) if finer detail is to be preserved.

What you do from here depends on (a) the effect desired and (b) your artistic ability. If you have a good time with an artist's brush or have a friend that does, you can try finishing the cast off with a naturalistic appearance. Use a good color photograph of your specimen, or a magazine illustration as a guide. Ordinary artists' oil colors will produce a creditable job, but should be applied thinly. Some startlingly realistic effects can be produced by using an air brush and a combination of transparent and opaque pigments *(figure 12)*. Most anglers won't have access to an air brush, but at least a silvery base coat that is often used can be applied using an aerosol aluminum spray.

You will find that a metallic spray produces an attractive finish and a series of casts in copper, bronze or even in dull black will make an impressive display on a camp or den wall *(figure 13)*. In general, the metallic finishes are more acceptable than a mediocre attempt at a natural paint job. Fortunately, if not satisfied with a final effect, one can always wipe off the oil paints (use a solvent if necessary) and start again.

If an artificial eye is used and embedded when the cast is poured, it should be painted and allowed to dry beforehand. Most anglers are not likely to have a glass fish eye handy and may find it most convenient to leave the natural contour of the eye as cast from the mold. However, an artificial eye greatly enhances the appearance of even a stylized metallic finish. (Most sporting magazines list taxidermist supply houses.) Note that the outer surface of the eye lens is about flush with the contour of the head. If you added the eye when the cast was poured, this was taken care of automatically, but if a hole is made in the cast to receive the eye, be sure the eye is recessed enough to avoid a "bug-eyed" appearance. Otherwise you'll have to explain to your friends that this was the way the fish looked right after you gave it that good crack on the noggin.

The Morel

Near the end of April and during the first two weeks of May, nature brings forth her earliest and most succulent food, the incomparable morel.

In France, where the mushroom is king, truffles (edible underground fungi) are hunted with swine or truffle hounds but the morel is hunted by the mushroom lover, himself. Regarded as a delicacy by the true gourmet, the morel affords even greater pleasure to the hunter.

Of all mushrooms, the morel is the beginner's best friend because it has come and gone long before poison mushrooms appear. All known species, from the *Conica* to the *Esculenta* resemble each other closely in size, shape and color. They are not easily mistaken.

The morel is a veritable chameleon for hiding. One can hunt for an hour without ever seeing them but once identified the rest lose their shyness and begin to pop out all over. Come May, a confirmed morel hunter, armed with his bag or basket wouldn't trade places with any sportsman.

What does the morel look like, where does it grow? Shaped like a giant strawberry, its color ranges from tawney to blackish tan. The surface is convoluted, for all the world like a beehive that has been shaken up by an earthquake. In size, morels range from an inch high to specimens 8 inches above the ground, often measuring 3 inches across the cone.

Contrary to the claims of "experts," morels are widely distributed; only the short season makes them appear rare. About the time the bloodroot blossoms and the trillium appear, they will be found standing singly or in clusters in a nest of pine needles or at the foot of an injured ash or a stricken elm. Often, too, they will be found near sun-warmed rocks on a burned over woods border or in an old apple orchard.

In any event, the morel is worth hunting. So highly is it prized as a food that French peasants once burned down whole forests to encourage their growth. If our outdoors-minded people look hard enough and carefully enough they will find this delightful food right at their back door where it has been all along, but unobserved. —NATHAN HORWITT, Lenox, Mass.

the back of the book

Skin diving and history

Skin divers have been instrumental in locating many an important historical find in the depths of unexplored waters. Those with experience have been helpful, too, in salvaging important historical material.

Unfortunately, most skin divers do not have the experience required to salvage most underwater relics in a manner that will make them most useful to historians.

In fact, the souvenir-hunting skin diver can be a serious liability by destroying or obliterating valuable finds.

Divers, who come upon relics of the past in the course of their operations, should report their findings to authorities in the field. In this way, salvage can be conducted in the most useful manner.

Dr. Albert B. Corey, State Historian, has cited the examples of historical treasures recently discovered in Lake George. These consist of wood, the wrecks of "bateaux" and frigates sunk in Lake George and other waterways, too, during early Colonial days. Unlike rusted iron and ceramics, which are comparatively easy to preserve, wood disintegrates when, after being under water for 100 years, it is brought into the air. A systematic method of preservation is required.

Skin divers can be most helpful in discovering and preserving sunken historical material if they will seek guidance from the State Historian.

Wildlife stamps

The 1961 Wildlife Conservation Stamps, produced by the National Wildlife Federation, are now available. These beautiful stamps, lithographed in six colors, depict 36 species of birds, mammals, fish, reptiles and plants. They feature scenes with real-life settings and are suitable for use on correspondence, mounted decorations and in album collections.

Artwork for the stamps was prepared under the supervision of Roger Tory Peterson, one of the world's foremost wildlife artists. They include:

Birds—The Ferruginous Hawk, Puffin, Sparrow Hawk, Eastern Bluebird, Iiwi, Cedar Waxwing, House Wren, Masked Duck, Meadowlark, American Goldfinch, Mottled Duck, Wood Thrush, Sora, and Rock Ptarmigan. *Mammals*—Elk, Young Mountain Lions, Bison, Raccoon, Hooded Seal, Mink, Golden Mantled Squirrel, Deer Mouse, Striped Skunk and Baby Red Squirrels. *Fishes* — Bluefin Tuna, Largemouth Bass, Bluegill, Troutperch, and Eastern Pickerel. *Reptile* — Fence Lizard. *Plants*—Blue Phlox, Scarlet Gilia, Painted Trillium, Blue Flag, Wood Lily and Showy Lady's Slipper.

These stamps have been issued annually since 1938, with income from sales of the stamps helping to finance educational programs and conservation projects of the Federation.

Waterfowl census

The final waterfowl census for the 1960-61 season showed little change in the total number of birds wintering in the State as compared with the past three years. The tally was 248,700 compared with an average of 240,700 for 1957-59. Twice as many redheads and at least as many canvasbacks as last year were observed giving some hope that a downward trend in these species had been reversed by being protected during the past gunning season.

The Long Island wintering grounds held most of the birds, 64 per cent of the total, with scaup, brant, black ducks and goldeneye the most numerous species. Next largest, 16 per cent, was the Central Lakes region where scaup, canvasback and redhead topped the list. The bays and shores of Lakes Ontario and Erie, along with the Niagara River, provided for some 12 per cent of the birds observed, mostly the goldeneye, canvasback and scaup.

Atomic forest

In California's Feather River County, there is a recently created atomic forest. Federal foresters have sent powerful radioactive material coursing through the veins of big pines and firs. With geiger and scintillation counters, they hope to chart its spread through the roots to other trees and learn the secrets of the twisting, tangled roots.

This may solve the question of why stubs of fallen trees that have neither limbs nor food-producing needles continue to grow; that they have been drawing nourishment from other trees resulting from the tangled growth and natural grafting of root systems.

The objective of the experiment is to find out to what extent root grafting affects a growing forest.

Westchester deer

The special shotgun deer season in Westchester County during January, 1961, netted a total take of 382 deer in comparision to 490 last year. Unfortunately, the record cold weather and deep snow kept the harvest considerably below expectations.

There was plenty of interest, however, with over 10,000 permit applications sent out from the Conservation Department's Poughkeepsie office. Only 3,645 permits were actually issued because of the extremely bad weather conditions.

The heaviest harvest was in the northern part of the county. This will help because deer damage has been most severe here. The herd remaining is still too large for the range and a season for 1962 will probably be in order.

Appetite

An average size whale may gulp down a ton of sardines along with a variety of other small fish and crustaceans at one feeding.

International good will

The Department's Olympic bobsled run at Mount Van Hoevenberg, near Lake Placid, played a key role in promoting international good will during the world championship races held in February.

This marked the first visit to the United States for many of the foreign racers and the people of Lake Placid went all-out to make them feel welcome. It's the kind of contribution that a small town can make toward winning the cold war—winning friends for America.

At least two U. S. racers, both from the Air Force, volunteered as substitutes on foreign teams after mishaps during the trial runs side-lined key members of the Austrian and British teams. If it hadn't been for these boys, the two foreign teams might have been out of the competition, although they'd traveled thousands of miles just to be in the race. That kind of co-operation is not likely to be forgotten.

The bobrun is the only one in North America, built for the 1932 Olympic Winter Games. It was turned over to the State Conservation Department the following year. The run is open to public riding on Department sleds with professional drivers at a very nominal cost.

Youth camps

Youth camps will be constructed in Rensselaerville in Albany County and Salamanca in Cattaraugus County to provide a valuable assist to the Department in carrying out important forestry, fish and game projects in these areas, in addition to helping rehabilitate young boys.

The camps will be built by the State Division for Youth on State-owned reforestation areas and are expected to be ready for occupancy by January, 1962. The Rensselaerville camp will receive boys between 15 and 17 years of age who are referred by Children's and County Courts, while the camp at Salamanca will receive volunteer teenage boys referred by authorized social agencies with the consent of the youths' parents.

The work program at the Salamanca camp will be directed by District Forester Edward J. Whalen of Jamestown. At the Rensselaerville camp, District Foresters Carl Fatzinger and R. Milton Hick of Catskill and Oneonta, respectively, will team up to direct operations. Regional supervisors of Fish and Game will co-operate in planning the conservation projects.

Forestry work at the camps will include improvement of tree plantations by thinning and pruning and construction of access roads for logging, fire protection, administration and recreational use by the general public. Fish and game projects to be scheduled include fish and marsh pond construction, stream improvement, planting food bearing shrubs and other game food and habitat improvement for deer, grouse and other game birds and animals. This involves pruning and grafting of apple trees to increase their yield, as well as limited cutting of trees to permit the growth of sprouts on the stumps so the browse is within reach of the deer.

The administration and maintenance of the camps, including care and custody of the boys, will be the responsibility of the Division for Youth.

Buddy anglers

To interest kids in fishing, there's one system that stands the test of time. It's the buddy system—an adult with a child. Here's the approach as it appeared in the *Pennsylvania Angler:*

(1) Leave your own tackle at home so you can devote all your attention to your pupil. (2) Fish where there are plenty of easily-caught fish like bluegills, perch, crappies or catfish, preferably in lakes or ponds where "straight down" or short-line bobber fishing can be used. (3) Employ good quality, lightweight, simply-operated equipment so that there is no extra physical or mental burden. (4) Start out fishing with a float or bobber with bait on a short line, using lively worms, so the bites can be readily sensed and catching fish best assured. (5) Don't scold or ridicule for any mistakes and don't let your charge become tired, hungry or cold, etc. Make the trip a short, active and successful one. Provide a seat or stool for comfort. (6) If old enough, be sure the youngster has a fishing license.

Boating safety

Youngsters 10 to 14 years of age, inclusive, must earn a safety certificate before they can operate a motorboat alone on New York waters.

There are more than 1,600 volunteer boating instructors throughout New York who are qualified to give the training program in order to provide every interested youngster the chance to take the 8-unit Young Boatman's Safety Course in or near his home town. The instructors have all been certified by the Conservation Department's Division of Motor Boats at more than 70 training institutes previously held throughout the State.

Detailed information on locations and schedules of training programs may be secured from Co-ordinators of Boating Safety. They include: Frank Ernst, Sr., P.O. Box 987, Buffalo 5; J. Webb L. Sheehy, 45 Exchange St., Rochester; C. Wesley Jackson, 317 State Tower Bldg., Syracuse; Commander Robert F. Stutz, Kattskill Bay; Gerald Pickleman, 133-137 Court St., Watertown; Richard W. D. Jewett, N. Broadway, Nyack; Richard S. Moser, Pinebrook, Allegany; William A. Smith, 30 Bay St., State Island 1; Arthur H. Johnson, Hill Place, P.O. Box 31, Huntington; R. B. Taylor, 966 Broadway, Albany 4; Robert Robinson, 534 Cayuga Heights Rd., Ithaca; Donald L. Guerin, 1139 Emerson Ave., Rochester.

Northeastern Wildlife

The Northeastern Wildlife Conference is scheduled for Halifax, Nova Scotia, June 12 to 14. The forthcoming meeting marks the second time that a Canadian province has been host to the conference which represents fish, game and related wildlife interests in northeastern United States and the Maritime Provinces of Canada.

The northeast sections of the Wildlife Society, American Fisheries Society, Conservation Law Enforcement Chiefs' Association, Association of Game and Fish Commissioners and the recently-organized Conservation Information and Education Association, will be represented.

There will be general sessions on conservation, fish and game resources and a series of panels devoted to more specialized phases of management, administration and education. Any interested person may attend.

Record lobster?

The Boston Museum of Science has a record breaking lobster of 42 pounds, 7 ounces. They would like to know if there is a bigger one on record.

Forest fire losses

Forest fire losses in New York State during 1960 dropped sharply from the average for the five preceding years. Compared with an annual average of 1,237 fires for the 1955-59 period, only 714 brush and forest fires were reported during the 12-month period that ended last October 31st. They burned a total of 5,065 acres. Fire losses in the Forest Preserve were especially low, with only 35 fires reported.

Favorable weather conditions throughout most of the State played an important part in keeping losses to a minimum. The fire incidence was fairly high during April and May when 64 per cent of the fires were reported, but frequent rainfall for the remainder of the year held forest fire hazards in check. The only exceptions were St. Lawrence, Clinton and Franklin counties where drought conditions prevailed from early July until late October, but even in these areas, fire losses were not high.

Jim Evans retires

Counting his friends literally in the thousands, among park men, legislators and public officials, high and low, past and present, Jim Evans has become a nationally known figure in parks and other public service as well. He is a charter member, past president and director of the National Conference of State Parks and a long time member of the American Institute of Park Executives. He has served under and known seven Governors and nine Conservation Commissioners. Jim's retirement marks the end of only the active and full time phase of a lifelong service to parks and recreation.

Jim Evans was born January 28, 1895, in Warners (New York), grew up in central New York and graduated from Syracuse University right after serving a hitch in the Marines during World War I. His regular State service began with the Department of Public Works in the Syracuse district in 1919, and followed seasonal and school vacation work for that Department for several years.

In 1924, he transferred to the newly unified Division of State Parks and began his association with Robert Moses in the development of the State parks from their very beginning to the present vast and continually growing system that is a model for the nation.

In 1926, he was transferred to Binghampton as head of the newly formed Central New York Region, remaining there for thirteen years and making a special mark in his productive use of work relief labor and CCC camps for park projects during the 1930's.

On February 14, 1938, he was appointed Director of State Parks, a position he held for just under 23 years until his retirement on January 1, 1961.

Jim will retain his residence in Albany and many of his associations. His many friends and colleagues will miss his colorful approach to getting big jobs done.—L. L. HUTTLESTON

For boys

A wealth of insight into the minds of youthful, future adults is contained in a 260-page report entitled, "A Study of Boys Becoming Adolescent." The study was conducted for the National Council, Boy Scouts of America by the Survey Research Center at the University of Michigan. The report is worth careful study and is available for $2 per copy from the Boy Scouts of America, New Brunswick, N.J.

One of the many intriguing aspects of the study deals with participation by boys of this age group in outdoor activities. Those centered on water ranked high among a wide variety of activities. Of all water activities, fishing and swimming headed the list. Least participation was in water skiing, and about in the middle of popularity was outboard motor boating. Activities such as camping and hiking ranked somewhat below fishing. Good, but not too surprising to us, is the great popularity of all the outdoor pursuits.

Togetherness

Fish management personnel of the Ohio Division of Wildlife are constructing 100- to 200-foot stone fishing piers on several lakes in Ohio to bring fish and fishermen together.

New park at Saratoga

A part of New York State's large-scale recreation program will get underway with a $2.7 million development of the Saratoga Springs Reservation as a new State park.

Plans call for a giant swimming pool complex, capable of serving up to 8,000 people a day; picnic sites for 1,000 families, with special facilities for groups; expansion and improvement of the present 9-hole golf course to an 18-hole championship course; construction of a new "par-three" golf course; and conversion of the Hall of Springs into a dignified, but popular-priced dining and dancing pavilion. Completion of the Saratoga development program will extend over a three-year period.

The new facilities at the Saratoga Springs Reservation will not conflict with the traditional services which the Spa has been offering as a popular health resort for so many years. Special care will be taken to preserve the restful atmosphere of the Reservation, while broadening its recreational value.

Development of the preliminary plans was made possible by the co-operation of the State Department of Public Works and Division of the Budget.

Carp in a thorn tree

Everyone knows about the "partridge in a pear tree" but a much rarer "bird" is a carp in a thornapple bush. These three shown here were only a few of the several hundred similarly stranded in the branches of trees and bushes this spring at the Conservation Department's game management area at Visher's Ferry on the Mohawk River.

High water during the spring break up surged through the area carrying the big fish—most of them winter-killed—into tree snags, many five and six feet aloft.

We feel this information may be helpful to those who had difficulty locating fish or getting them to bite. Try tree fishing.

Marsh manual

A manual of standardized designs and field procedures for the construction of small marshes has been prepared by the habitat management committee of the Atlantic Waterfowl Council. The 159-page publication is a compilation of the most successful techniques and procedures drawn from field experience in all of the Atlantic Flyway states. Copies may be obtained from the Vermont Fish and Game Commission in Montpelier at $2.35 each.

Rockhounds

The public schools face many problems, a little known one being the rapid increase in America's "rockhound" population. These enthusiasts actually invade New York schools and once that happens, the teacher is forced to play the tragic role of a silent onlooker as the "rockhound" flashes his diamond, fossil or petrified snail on a captive audience. Children are very susceptible to "rockhound" fever and revel in the joys of self-instruction and freedom from the usual teaching straight-jacket. Worse yet, they may turn on their teacher and terrify her with such questions as: "What makes emeralds green?", "Why are quartz crystals hexagonal?" or "How can you tell the age of this fossil?"

Perhaps the following warning should be posted in teachers' lounges: Beware of "rockhounds" and "rockhound" fever; both are fatal to teachers who have not been innoculated with the academic virus of such earth sciences as mineralogy, geology or time-tested physical geography.—DR. JOHN SHAFFER, *Audio-Visual Services, S.U.N.Y. College of Education, Cortland*

Death of a giant

Some 300 years of tree growth came to an end on September 30, 1960 when the Thorndale oak at Millbrook, crashed to the ground with vibrations felt in homes 500 yards away. Since 1941, this tree has stood as the largest red oak in the United States, according to American Forestry Association records. In that year, the tree was measured and entered in the big tree contest by Humphrey F. Hedgecock, District Forest Ranger for the Conservation Department. The last measured circumference was 24 feet, 9 inches.

Hurricane "Donna" was directly responsible for the eventual demise of the Thorndale oak. During the storm, two large anchor roots on the south side of the tree were broken. Several days later, the Weather Bureau forecast "light winds with occasional gusts" and they brought the tree crashing down.

This historic tree dated back to the Great Nine Partners Patent of 1697 wherein it was designated as a boundary marker. Its minimum age is, therefore, 263 years. How large a tree had to be to qualify as a boundary marker in those days is anyone's guess. A reasonable guess, though, could be 90 years and 30 inches in diameter giving an estimated total age of 353 years. The Thorndale oak may then have predated the discovery of the Hudson River by Henry Hudson in 1610.

In the 18th Century, the land on which the tree stood came into the possession of the Thorne family as farmland. For more than a century, this land grant known locally as Thorndale, has been managed as an estate. Over a period of many years, thousands of dollars were spent on preservation of this historic giant. In addition to feeding, the tree was sustained by an intricate system of bolting and cables in the trunk and limbs. So much sectional concrete cavity work was included in the tree that it would be a liability to plunge a chain saw blade into the main trunk.

Reinhold Strobel, superintendent of gardens at Thorndale, reports that over 19 dump-truckloads of branches were carted away and present plans called for the use of explosives to reduce the main trunk and root system for removal when the ground was frozen.—FORESTER FRED W. OETTINGER

Nice shooting!

The 1958 waterfowl season at the Swan Creek Highbanks in Michigan provided 11,802 permittees with 1,569 Canada geese, 4 blue geese, 2 snow geese, 103 mallards, 15 black ducks and 2 baldpates. Hunters fired 103,000 shells in over 44,000 hours of hunting. Eleven per cent of the cost of shells will go to more wildlife management under Pittman-Robertson Federal Aid to Wildlife Restoration.

Ed. note: That, if their count and our arithmetic is accurate, figures out to a little more than 60 shells per bird bagged!

Millionth graduate

The country's largest outdoor safety education program, sponsored by the National Rifle Associaton of America, recently graduated its one-millionth student — Samuel L. Cicero, 20, of Niagara Falls.

New York's Hunter Safety Training Program had the honor of graduating this millionth student who was trained by James Reed and Jim Richards, veteran N.R.A. instructors of the Hartland Conservation Club in Niagara County.

The Hunter Safety Program was pioneered in New York in 1949 and since that time 28 other states have adopted similar programs, either by legislation or on a volunteer basis. The programs have been a tremendous success, attested by the fact that, according to *Accident Facts*, published by the National Safety Council, "national public firearms fatalities" have dropped 22 per cent in the last ten years.

Today there are 35,000 certified instructors throughout the country. While the instructors of Gasport (New York) had the honor of graduating the millionth student, all of the volunteer teachers through their hundreds of thousands of hours of safety instruction have contributed to this milestone.

Black mare vs. black widow

The world's sole manufacturer of a vaccine to counteract the venom of the deadly black widow spider is an old black mare. Once termed a failure as a plow horse, the mare gained unique distinction with the help of scientists at the Merck, Sharpe and Dohme Pharmaceutical Laboratory.

Laboratory workers first collect the insects, remove the venom and after processing it, inject it into the mare's body. The mare's body reacts by producing antibodies to counteract the venom. Finally, these antibodies are removed from the black mare's blood stream for use in treating the 1,500 persons who are bitten by the deadly black widow each year.

Oil, ducks and the Seaway

Since the development of the St. Lawrence Seaway, individuals and civic groups have expressed concern as to the effect of Seaway commerce on the recreational values of eastern Lake Ontario and the St. Lawrence River. The importance of this region to waterfowl, both during the spring and fall migrations, is well known. During the 1960 fall aerial waterfowl census, made in late November, some 54,445 birds were observed in this region, representing about 22 per cent of the State total.

Large-scale petroleum pollution has not involved any large groups of birds at any specific location in the region but there have been persistent reports of oil contaminated birds. To secure some specific information from waterfowl hunters in the region, a selected group of 53 hunters known to hunt the eastern end of Lake Ontario and the St. Lawrence River downstream to Massena, were contacted by letter, and asked to return a report card, giving the following information: Locality hunted, number of birds killed during the 1960 season, number of birds and species oil contaminated, remarks.

Thirty-eight reports were received indicating a kill of 3,063 waterfowl of which 265 were oil contaminated. Eighty seven per cent of the birds affected were scaup and goldeneye. These are the most numerous species in the waters of this region during the fall hunting season. Their flocking habits are an important factor in their vulnerability to oil contamination.

Some of the contaminated birds were examined and the amount of oil on them varied from a slight staining on the breast feathers to heavy coatings. It should be noted that all of the birds reported were capable of flight when reduced to the hunter's bag. Birds heavily contaminated by oil pollution are often incapable of flight and, of course, cannot be measured in terms of total hunter bag check.

The effect of oil contamination as a factor in waterfowl mortality is not easily measured but it is probable that birds incapable of flight due to oil contamination are highly vulnerable to predation. Also, the effect of oil, in relation to the loss of the insulation value of the plumage for preserving body heat results in further losses.

The November aerial census for 1960 reported 37,000 scaup in the region sampled for oil contaminated birds. Hunters reported that 22 per cent of all the scaup killed were oil contaminated. If this percentage is arbitrarily reduced to just 10 per cent, it is evident that the percentage of contaminated birds may be nearly one-fourth of the population.

The spectacular waterfowl concentrations of Lake Ontario and the St. Lawrence River are an important part of the recreational resources in this region. There is complete agreement that oil pollution is not compatible with the many recreational uses of the waters of the St. Lawrence River and Lake Ontario. It can be prevented and a mutual effort must be made for its complete abatement in the interest of the total recreational resources of the region.

People—people—people

A United Nations survey shows that human populations are increasing at the rate of about 5,000 persons every hour. The world population will be doubled at the end of the century if this increase continues. Conservation problems will be tripled about that time, too!

Organized bow hunts

Three organized bow hunts were conducted this year, two at the Conservation Department's Howland Island Game Management Area and one at Montezuma National Wildlife Refuge. The deer herd at Howland Island proved to be a little above average in size while the Montezuma herd was well below average. The latter situation may have been caused by a large winter dog kill last year.

The hunts, largest of their kind conducted in New York State, were administered by volunteers from bow hunting clubs under the general supervision of State and Federal game biologists.

Results of the hunts accounted for 41 deer taken and 1,086 different bow hunters were provided with 14,360 recreational hours of bow hunting. Success was achieved by the efforts of many volunteers—they contributed 87 working days or 870 hours. There were 52 different volunteers representing ten bow hunting clubs and they drove 6,960 miles to do their work.

Lobster—life and limb

The largest lobster of official record weighed 42½ pounds, was three feet long and estimated to be 50 years old. This record dates from 1935 and is from Massachusetts.

Strange as it may seem, some lobsters are left handed, that is, their crusher, the most important of their two large claws, is on their left front leg. The male lobster has a longer body, larger claws than the female but a narrower tail. Also to grow, a lobster must shed or crawl out of its hard, non-stretching shell, expand, then a new shell forms. A lobster's two claws are different, one has large teeth and the other doesn't.

These are some of the little known oddities of that popular marine delicacy, the "champagne" of sea foods. Its delicious firm white meat, garnished in a bright red shell, causes one to overlook its somewhat outlandish appearance, and the fact that it is a scavenger of the bottom of the sea.

Lobsters migrate but short distances, if at all, and prefer the cold rocky bottom of the New England coast, New Brunswick and Nova Scotia. They are caught in slotted wooden traps, known as lobster pots, which somewhat resemble an orange or egg crate in size. Baited with dead fish, these pots, heavily weighted, are sunk to the bottom of coastal waters. Their locations are marked with floating buoys. Once a lobster gets inside this trap it becomes so entangled in a mesh of cord netting that it is practically impossible for it to get out. The pots are hauled up daily by fishing boats, generally in the early morning. After the catch is removed, the pot is rebaited and dropped back into the water, ready for the next catch. Lobsters are most active at night in their search for food.

Unlike fish, the female lobster does not scatter her eggs in the water but carries them "glued" to the underside of her long curled-up tail until hatched, which generally takes about a year. When born, the baby lobsters are but ⅓ of an inch in length and bear little resemblance to the adult. They swim to the surface during the daylight hours but scatter to the depths at night. Cod fish are their worst enemies.

The hard shell of the lobster doesn't grow. During the first year a baby lobster will shed its shell from five to seven times, each time expanding about 15 per cent in size and 50 per cent in weight before its new shell hardens. This takes place in a period of about five hours. As the lobster grows older, it moults or sheds its shell less frequently, generally about once a year.—C. D. Wagoner

Year class

One reason for the wide range in catch of fish from year to year by sport and commercial fisheries is the variation in success of spawning. A report of Lake Erie studies by the research vessel "Musky II" of the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, shows that more young walleye and yellow perch were taken in some single trawl tows in 1959 than in all tows combined (approximately 400 tows) in 1960! This is attributed to the fact that during 1959 a so-called dominent year class of walleyes came into the fishery—consequence of earlier very successful hatch and survival.

Bald eagle study

The first continent-wide survey of bald eagle numbers and distribution will be made by the National Audubon Society. The study is prompted by widespread reports of a serious downward trend in the population of the great, white-headed bird that serves the United States as its national emblem.

The Society's research department will seek the co-operation of federal, state and provincial wildlife officials and conservation officers throughout the United States and Canada along with local Audubon Societies' help. The observations of skilled bird watchers as well as professional ornithologists will be sifted and tabulated.

Some wildlife experts feel the bald eagle may already be in deep trouble because of water pollution, drainage, cutting of nest trees and other factors that destroy its habitat. Known to range from Alaska to Florida, the species prefers coastal areas and inland bodies of water, as it feeds heavily on fish and other aquatic animals.

A survey of the golden eagle, a related species that is found in Europe, Asia and Africa as well as in America, may be undertaken at the same time although the two birds are difficult to tell apart in the juvenile stage. The golden eagle is a bird of the uplands and plains and is often persecuted as a predator.

Intensive research into the eagle's biology and habitat requirements probably will follow the extensive survey. The Audubon Society envisions a five-year study costing up to $50,000.

Tree planting

For the second successive year, tree planting in the United States exceeded 2 million acres during 1960, according to the U.S. Department of Agriculture. About 600,000 acres, or between 25 and 30 per cent of the land planted, was cropland placed in the Conservation Reserve Program under 10-year contracts.

A decrease in Conservation Reserve plantings did occur in one class of planting, that of small woodland owners. In 1960, it was 12 per cent less than in 1959. It is here that the effort of conservationists, forestry organizations and forest industry with the help of local, State, and Federal governments needs to be directed toward stimulating more planting on small woodland holdings. A tenfold increase in planting on these small holdings would eliminate the backlog in the acreage needing planting by the year 1970.

This is a big order but our present rate of planting has been little more than the replacing of trees depleted by cutting, fire, insects and disease.

The cougar

The cougar has a greater variety of common names than most any other animal. Puma, American lion, catamount, mountain lion and panther are among the most common. New York's last reported mountain lion was in 1893.

Early *Conservationist*

Way back in January, 1917, the Conservation Commission of New York published a *Conservationist* magazine. It was a 16-page monthly publication and was continued through Volume 4, No. 12 of December, 1921.

We have been fortunate to secure all of Volume 4, and if anyone has other issues they would care to donate, they would make a valued addition to our historical files.

Tsukiiso—Gyosho

Japanese coastal marine waters have been improved since ancient times for better fish production. Improvements involve either of two general types. The first is tsukiiso ("constructed beach"), to promote the growth of useful aquatic plants and animals. The second is gyosho ("fish reef"), designed to encourage the occurrence of fishes.

Tsukiiso for seaweeds has traditionally been accomplished by simply dumping rocks into the sea at suitable locations. In recent years, this has been supplemented by blasting natural rock reefs with dynamite to clear away coralline algae and other useless cover and by the substitution of concrete blocks for natural rocks.

Gyosho has ranged from planting timbers on the fishing grounds to sinking old boats, sometimes filled with rice bran or other fertilizing materials. In recent years, large numbers of oil drums and sections of concrete pipe have been placed on the sea bottom in many areas around Japan to serve as "fish reefs." Now, the standard practice is coming to be the installation of especially constructed hollow concrete blocks. In a recent example 50 so-called "fish apartments" were installed in one area. These were of reinforced concrete, a meter square, with walls about 10 centimeters thick and one large opening in each side. The objective was to increase the populations of mullet and porgy.

Within the past decade this type of work has gone ahead at an increased rate, under subsidies from the national government, to assist the coastal fisheries. Investigators have had difficulty in developing techniques for accurate quantitative evaluation of the effects of the projects but evaluations of the results of both of these types of improvement work apparently tend to be favorable.

Pollution control grants

Federal water pollution control grants to municipalities will be continued at the $45 million level during the 1961 fiscal year. For a while it looked as if the program would be cut in half. Also continuing at the same level will be the $2.7 million for program grants to states and $300,000 for program grants to interstate pollution control agencies. These grants help the state and interstate agencies finance their own pollution control programs. Funds in the amount of $500,000 were also appropriated for the initiation of a plan to improve the quality of water in the Great Lakes.

Golden Smoky Bear award

The newspapers of America have been presented with a Golden Smoky statuette award for outstanding contributions to forest fire prevention. More than 5,500 newspapers represented by the National Editorial Association are so honored by the presentation.

The newspapers of America have been the backbone of the forest fire prevention program through their editorials, news stories and space contributions and have helped make it possible to save the American people more than $10 billion worth of forest resources. Golden Smokys were also presented this year to Foote, Cone and Belding Advertising Agency for its 20 years of public service donated to promote forest fire prevention and to the Post Office Department for its forest fire prevention program through the use of truck posters and mail cancellation stamps.

Dues on ice

The Big Moose Fish and Game Club awards a prize of $25 cash to the one who guesses the nearest date and hour that a steel barrel, half full of rocks, placed on two boards between Martin's and Craig Point, with a large flag, goes through the ice of Big Moose Lake.

Entries must be accompanied by annual club dues—$2—each member.

Conservation by the carton

What does the word "conservation" mean to the man on the street? Not much, judging from the answers given by a hundred people to John D. Bulger, Northeastern Representative of the National Wildlife Federation. In fact, the answer which best distilled the opinion of those asked, from all walks of life, was given by a Washington, D.C., cab driver. Asked "What Is Conservation?" he replied, several traffic signals and some head-scratching later: "Well, sir, that is a mighty bafflin' question!"

To make the average citizen more aware of what the term "conservation" means, most conservation agencies are looking constantly for ideas to help this promotion.

A clever and original idea comes from Santa Fe, (Kansas) Chapter of the Soil Conservation Society of America. Their project committee investigated the possibility of using one side panel of a half-gallon milk carton as a space for a conservation picture and slogan. One dairy serving most of an eight-county area was receptive to the idea. They agreed to let the Chapter use one side of the half-gallon carton at no cost. The dairy arranged for a meeting with the salesman for the paper company furnishing their milk cartons. The salesman advised that the only cost would be $25 for a metallic plate that could be used indefinitely. The plate is kept on file with the paper company and the dairy orders 100,000 at a time with the picture and slogan changed with each order, or about every three months. A Sportsmen's Club sponsored the second plate, and a County Soil Conservation District, the third. Sponsors for other plates shouldn't be too hard to come by.

Here is a project which sportsmen's clubs and other conservation-minded groups could really take hold.

Wealth in wood

The result of developing new uses for sawmill leftovers from cull logs and weed trees is creating new uses for wood that is bound to expand markets for timber growers.

The day is in sight when a use will be found even for twigs, branches and other parts of the tree that presently go to waste.

Here are a few new ones and expanded use of old ones: Hardboard wall panels with a distinctive decorator pattern of random-colored particles imbedded in the surface; gracefully "scooped-out" chair seats for use in modern school furniture; acoustical ceiling panels made from pulped lodgepole pine with random holes drilled in attractive designs.

Each of these was created largely from woodfiber material that would otherwise have gone unused—sawmill and veneer mill leftovers, so-called weed trees or from sound wood in cull logs.

Wood composition boards—hardboard, particle board, and softboard production—is on the increase. Unbarked sawmill slabs, mill ends, planer shavings, cull logs and low-grade timber species, all are finding their way increasingly into wood composition products.

New flakeboards utilize maple and alder, heretofore little-used species, in addition to shingle mill leftovers for raw material. Hardboard is generally manufactured by steam exploding or mechanically fiberizing wood. The resulting fibers are compressed under heat into an extremely hard, dense board. Production has more than doubled in the past ten years (2 billion square feet). Some forecasters see it doubling again by 1970.

Particle board, flakeboard and chipboard is made by compressing distinct particles or flakes of wood together with a synthetic resin or other added binder. Production is at a rate of 75 million plus square feet annually.

Softboard or insulation board is usually made from wood pulp and is held together entirely by the felting properties of the wood fiber. Production here is increasing steadily.

"I've seen better"

Weimeraner, looking down his nose at contestants in 1960 dog trials at Conservation Department's Three Rivers Game Management Area near Syracuse

Letters to the Editor

East Branch vs. Route 17

Dear Sir: The article entitled, "Fourteen Points," on page 39 of the D.c.-Jan., '60-'61 issue of THE CONSERVATIONIST lists recommendations on how to save streams during road construction.

This reminded me that the N. Y. State Highway Department is now taking bids for a new stretch of Route 17 from East Branch to Hancock along the East Branch, Delaware River.

The present road travels this entire distance on the northern hilly side of this stretch of a wonderful trout stream. At present most of this stream is well isolated from busy Route 17. Many stretches are difficult to reach and provide a pleasant solitude for many a trout fisherman.

But! This new road will be a major project. It will be a divided, four-lane superhighway, running right through the stream valley with bridges crossing the stream four or five times. This new superhighway will bare all this stretch of stream to all persons as they zoom along in their super-automobiles. This can't be helped; it's a necessary part of a growing civilization.

However, now is the time for the Conservation Department and all interested parties, to start co-operation with the State Highway Department, Federal agencies (I assume the project gets Federal highway funds), and the ultimate contractor, to see that this project is completed without ruining this stream, without filling in all the deep holes, without unnecessary bull-dozing of gravel from the stream beds, etc. There are laws on the books now to prevent those practices. Let's hope they are adhered to, rather than to be sorry later, because a stream once ruined may take years to come back, or perhaps be ruined forever.

Ed. Peabody, Irvington, New Jersey

• *We appreciate your interest and concern with problems of preserving natural water resources connected with construction of the new Highway Route 17. I can assure you that this Department is very well aware of these problems and anxious to do everything possible to preserve the natural resources affected.*

At the present time, development of a 7.35 mile section if this highway, approximately from East Branch southwestward toward Hancock, is under contract as a part of this highway development. Planning for construction of this section has been underway for several years, and in 1956 it reached a point at which it appeared desirable for our fisheries personnel to review the planning and suggest possible alterations or procedures with reference to the plans calculated to preserve fisheries values. On January 26, 1956, an inspection of this section of stream and a conference with engineers involved in the planning was carried out by our personnel. Several specific and general suggestions were made for preservation of these values or for amelioration of damage.

The single feature of the planning in this section which gave us most concern was the proposal to relocate a 4,500-foot section of the East Branch in order to avoid building two bridges. It was estimated by the engineers that this feature of the plan would save approximately $1 million in construction costs. In this particular situation, we were unable to suggest an alternative plan which was at once practical and reasonable from the financial point of view. To ameliorate expected damage from such relocation, however, the Department of Public Works agreed to construct three check dams in this area designed to provide pools for fish, which would otherwise be lacking.

Liaison between this Department and the Department of Public Works is excellent with relation to the planning of construction projects affecting water resources. Sections of Route 17 construction both east and west of the section now under contract are in relatively early planning stages at the present time. It is specifically agreed with the Department of Public Works that when planning for these sections reaches a stage where consultation on natural resource preservation may be significant, representatives of this Department will be notified.

We appreciate your interest in this matter. Certainly a great many trout fishermen have had reason to be vitally interested in the effects of such highway construction upon our water resources.—C. W. Greene, Chief, Bureau of Fish

The money tree

Dear Sir: In the January issue of *The Readers' Digest* an article entitled, "Money Does Grow On Trees," suggest that those interested in tree-farming and desiring information and help should write to their State Forestry Department.

I own about 200 acres at Severance in Essex County, about 40 acres of which is abandoned farm land on which there is no timber and the balance of which is a mixture of hard and soft woods most of which has been selectively but haphazardly lumbered off twice in the last 60 years.

I would be very much interested in getting as much information as you can give me about the proper methods of reforestation and tree-farming this property. I have also heard that it is possible to get seedling trees from the State, free or at nominal cost, for such purposes. Any details you can give me on that question would also be appreciated.

S. B. Dobbs, New York

• *The article to which you refer has prompted many letters of inquiry and stimulated much interest in forest management. I think in all fairness, however, it should be pointed out that examples presented by the author, Pete Farb, are far from representative of the average wood lot where income is concerned. The inferences of high yield on the investment must of necessity presuppose a well-stocked wood lot of the more valuable species which is hardly the situation in most unmanaged stands. In a majority of cases the conversion of an unmanaged or mismanaged forest to one yielding a reasonable and periodic income may require several improvement cuttings over a period of 30 to 50 years. I do not write this with the intent of discouragement but rather to minimize discouragement in the future due to an unrealistic and over-optimistic viewpoint today. May I suggest that you contact the Conservation Department's District Forester in your area. He will be glad to meet with you or your representative on your property. After a reconnaissance of the area he will be able to advise you as to the proper management practices to bring the woodland to optimum production in the shortest possible time.—E. H. Huber, Senior Forester*

Cats and hares

Dear Sir: I wish to commend you on the fine issue of THE CONSERVATIONIST Dec.-Jan. issue which you recently published. The article and drawings concerning N. Y. State game animals, particularly, drew hearty approval and comment from fellow subscribers and friends.

The article on the bobcat stated his range to be Adirondacks, Catskills and Allegany areas. Just how prevalent is the bobcat in western New York and the Southern Tier country? I have heard stories of their being seen and in some cases shot in Cattaraugus County but always classed them in the same category as "Panther sightings." What are the objects to introducing these cats into a area?

Secondly, I understand there are areas in the State where the European hare ranges. Could you pinpoint a couple of these for me and let me know what the prospects are for an ordinary hunter getting access to hunting them?

H. Wayne Davis, Salamanca

• *As stated in the article you refer to, bobcats are not "thick" in any part of their range. Every year a few are reported seen and taken along the Pennsylvania border and throughout the Southern Tier. Most of these animals seem to be put up by deer hunters and either seen or shot at that time. Regarding the European hare, Dutchess and Washington counties have the heaviest populations, the lower parts of Herkimer, Montgomery and Schoharie have a smaller scattered population. Dutchess County has much posted land but hunting by permission of the owner is allowed in most cases.*

These hares take cover in the open fields rather than in the brush as cottontails do. Anyone has to learn by experience what constitutes good hare hunting cover.—Edward R. Maunton, Conservation Dept.

How fast a fisher?

Gentlemen: At dawn one day last summer, from the cabin window, I saw what I thought to be a huge black cat. As this took place in the Laurentian Mountains, three miles from the nearest village, with no cat-owning neighbours in the area, I wondered.

In your December-January issue, Mr. Maunton's article on "Some Animals of New York" describes the fisher as "the black cat of the Adirondacks." Yet the picture on page 24 shows him as brown and reddish-brown. It states: "They are thought by a few people to prey on marten, but this was probably based on finding a few scraps of marten fur in a few fisher stomachs. It's true that fisher are very fast, but compared to marten they are slow pokes."

My National Geographic Society book, "Wild Animals of North America," portrays the fisher as coal black and states, "The fleet marten can overtake a red squirrel in his leafy back yard, but it takes a fisher to catch a marten. Faster in the treetops than any other North American mammal, the fisher sometimes dines on his close relative. He's fast on the ground too, and can outrun a hare. His legs are short, but he can cover 16 feet or more at one bound."

Possibly there are both brown and black fishers. Of whatever color, it does not change the color of your most excellent magazine.

Paul S. Gravel,
Mount Royal, Canada

• *"Black cat" is a local name for the fisher in the Adirondacks. It is seldom black and definitely is not a cat. Their color varies from almost solid black to a grizzly brown. Most male fisher are lighter in color than the smaller females. The usual, or common color, for males in the Adirondacks is a grey, grizzly color on top of head and shoulders shading off to darker color toward the hind parts.*

From a distance and in poor light, most fisher appear much darker than they do when viewed close up, under good light.

As to their being active in the tree tops, my own experiences and the experiences of older men don't agree with the statements of some writers. The Adirondack fisher spends most of his time on the ground. He can and does climb trees but seldom have we found one crossing from one tree to another, even to escape a hunter.

He definitely cannot outrun a hare but catches them by persistently following them until the hare panics and gives up.

You probably are aware that much of the writings on the habits of wild animals are written by people who are writers rather than woodsmen and much of their data come second hand and are often unreliable. Also, that the habits of wild animals in different localities and types of cover vary. It is possible that fisher, in very dense timber, where the limbs interlock, may spend more time in the trees than the Adirondack fisher does and have much different ways of securing their food.—Edward R. Maunton, N.Y.S. Conservation Department

Ice caves

Dear Sir: In one of the recent issues of THE CONSERVATIONIST, there was published an article on the proposed establishment of wilderness areas in the Adirondack Forest Preserve. In the description of one of these areas, #6—Siamese Ponds—there was a mention of the presence of ice caves.

I have tried to determine the exact location of these caves through discussions with outdoor friends, but with no success.

Would you please provide me with any additional information that you may have relative to these ice caves. I am particularly interested in exact location and best time of year to see them. If this information is not available in your organization, please forward this request to the proper agency of the department.

Leon J. Sliva, Amsterdam

• *The ice caves you inquire about are located on top of Chimney Mountain, reachable out of Indian Lake Village. Go along to King's Flow; there's a trail to the top. A good hiker can reach there in three-quarters of an hour. There are deep crevices in the rocks into which the snow piles and ice forms and remains into August.—Roland B. Miller*

Flowering chestnuts

Gentlemen: I recently heard that you are interested in locating any flowering chestnut trees since a great number of them have been destroyed by blight in past years.

There are three full grown trees on a lot adjoining my property, which are going to be needlessly destroyed in the clearing of said lot.

These trees are at least 75 feet tall, obviously very old, and in the spring have large, fragrant lavender blossoms, which are bell-shaped: the scent of which is similar to that of the wisteria blossom.

I certainly am against the unnecessary destruction of any tree. Is there anything the Conservation Department can do about this act?

Phyllis Sweek, St. James, L. I.

• *The trees which you describe as having large, lavender, fragrant blossoms in the spring are probably plants of the Empress Tree, Paulownia tomentosa, native to China. They definitely are not chestnut trees, which have long tail-like spikes of small whitish flowers in late June or July.*

The Conservation Department has no control over the planting, or removal, of trees on private property by their owner. It would seem that this would be a matter for you to take up with the owner, if you wish to have the trees preserved.—Ralph H. Smith, Conservation Biologist

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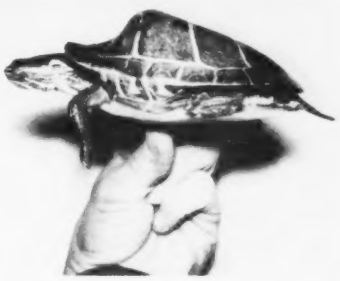

Hunchback

Dear Sir: Last summer I caught this eastern painted turtle in a trap at Liberty Corner, New Jersey. It has been a good pet since then. Do you know cause and incidence of its hunchback condition?

Wayne Frair, Briarcliff Manor

• *The abnormality, such as shown in the shell of the turtle, has been recorded before. As usual, the Greeks had a word for it, "Kyphosis." The condition is presumably caused by growth irregularities between the shell plates and the ribs during embryological growth. According to Archie Carr's "Handbook of Turtles," 1952, page 46, it has been recorded in 14 species of turtles belonging to five different families.*

Apparently, the turtles are able to survive with this condition although they must be somewhat handicapped compared to normal individuals of their species.—E. M. Reilly, Jr., Curator, Zoology, N.Y.S. Museum and Science Service

American chestnut

Editor: I thought you might be interested in the attached pictures of the good old American chestnut.

I've followed your reports on them from time to time, but never thought I'd run across any except for the ones that shoot up from the old root stock and then blight off.

Last year I heard about an elderly gentleman living in Mamaroneck who had a real American chestnut and knew what he had. I contacted him and went over to see the tree. It's truly beautiful thing to see, about forty feet high and a foot across at the trunk. He has a few smaller ones, most of them seedlings from the parent tree and even goes to the trouble of bringing in a bee hive each year to help pollination.

I managed to get a dozen nuts from him and held them over in my refrigerator 'til they germinated. I got eleven seedlings which are pictured in my coldframe. These seedlings were distributed to friends who had homes or farms where the trees would not meet the fate of being in the way of a housing project and two were given to the Bear Mountain Park.

Late last year, I was out in some fields near my home working out my dog for the coming grouse season and I noticed some burrs on the ground. I looked around and saw the pictured tree along the edge of the field. I'd passed it hundreds of times before and never looked at it twice 'til then. It was a chestnut, doubled at the base, one-half was hit by blight, but the other in good shape *and* full of burrs. I collected as many as I could, but found them all sterile for lack of another tree for pollination, but they were enough to have it definitely identified as a true American chestnut. The tree is about 30 feet high, 8 inches across at the trunk. This spring I hope to get a branch from my friend in Mamaroneck and try to do some pollinating.

A note of interest: The tree was growing directly under the Con Edison power lines and I'd heard there was a new line to be put through there soon. I wrote to them about it and they sent a man up to check the location. The next week the dozers were due and they took everything out of that area except that tree. Three cheers to Con Ed.!

Eugene Kelley, Hartsdale

• *I would appreciate learning the exact location of this or any other American chestnut tree that has survived to become a foot or more in diameter breast high. It is among such trees that we may find one or two that have survived because of true blight resistance, rather than from mere isolation from sources of the fungus. The occurrence of seeds shows that there must be other trees nearby to provide the necessary pollen for cross-fertilization. My only other suggestion would be to protect your seedlings from the squirrels, who otherwise may bite the seedlings off, or dig them up in search of the cotyledons.*

When chestnut trees start to flower, they usually produce burrs even though cross pollination may not occur to start seed formation. The girdling effect of the fungus attack usually stimulates the premature formation of flower buds on blighted stems, so that numerous small trees may flower and form burrs just before they die.

If the first tree you mentioned should prove to be blight-resistant, the seedlings may inherit enough of this to be worth keeping. Because of the susceptibility to blight of the second tree, any seedlings from it would probably be worthless.

Isn't it a genuine pleasure to find a utility company with a sympathetic attitude?—Ralph H. Smith, Conservation Biologist

Archery

Dear Editor: Can a person hunt pheasants before the regular season using a bow and arrow? If so, do you need a special archery license?

Richard Roehr, Rensselaer

• *Pheasants may be hunted with bow and arrow during the regular open season* (not before) *under a hunting or combination hunting and fishing license. The special archery license pertains only to deer and bear, permitting such licensees to hunt big game with bow and arrow fourteen days prior to the opening of the regular gunning season on big game, as well as during such regular season.*

In hunting pheasants with bow and arrow, it's helpful to be (1) an optimist, and (2) an expert archer.—Editor

Bank fishermen

Dear Sir: Why is it the New York State Conservation Department doesn't help the hundreds of little guys, who love to hunt and fish? We go along with the raise in price for our tags. But we don't get a damn thing for it. I've given up the idea of hunting; still I buy my tag. But fishing; that's another thing. We are happy to fish in the Niagara River; maybe we catch something, then again maybe not. We have the foot of Ferry Street, which is the entrance of one of the breakwalls. I've fished there for years, day and night. Boys who want to be future sportsmen are learning the hard way with a swift current and snags. Well I guess the person who made up the word, must have meant the Niagara River. I can't afford a boat or even a raft. I'm not alone in this either. Maybe one of the wardens can tell you how many come down there to relax.

Now what's happening! Another boat livery is being built there. Every place we go a livery is going in. What are we to do? I love to fish from a bank not a boat.

Do you have to be a club member of a big boat organization to enjoy life?

Hunting clubs have bought the land up for their members and look what we have.

The time has come for the N. Y. Conservation Department to step in and help us little guys out. We know you have money for just such a cause. Do something about it.

Hurschel Seneca, Buffalo

• *I am sorry that I am not personally familiar with the situation at the foot of Ferry Street in Buffalo as explained in your recent letter to Al Bromley, Editor of* The New York State Conservationist. *I do know that sportsmen like yourself enjoy a great deal of fishing pleasure along the shores of Niagara River and in the vicinity of the Breakwalls, and I sincerely hope that provisions for such fishing can be continued wherever possible.*

You will understand that almost all shoreline property is privately-owned and that such owners have what is known as riparian rights to use the dockage and other facilities afforded along the river. Most of this shoreline property is extremely valuable and costs to acquire it for fishing purposes, in most cases, would be prohibitive. It may be that the location that you have in mind is publicly-owned by the city or county, in which case, use would be subject to regulation by the local governing agency. If you think this could be the case in your situation, it might be worth your while to check with your local authorities.

You are doubtless aware of this Department's program to purchase fishing rights wherever possible along trout streams and elsewhere under the Recreational Resources Bond Issue that was approved by the voters last fall. Because of costs involved, most such purchases will be in rural areas and may not be of much help for a person like yourself, unless you are prepared to travel at least a reasonable distance outside of the city. For most fishermen, however, this long range acquisition program will solve the problem of a place to fish.

I wonder if you are a member of a local sportsmen's organization. There are several active groups in Buffalo, which are more than willing to look into problems such as you outline, especially in situations where the sportsmen's rights are being violated. If you need the names of the leaders of some of these organizations, we will be glad to furnish them on request. I would strongly urge that you discuss your problems with one of these groups.

You certainly are not wasting your time, as you indicate, in letting us know about your needs and what you think of our programs. We do appreciate your opinions and suggestions and want to help you in any manner possible—Robert F. Perry, Supervisor of Fish & Game, Region No. 1

Bubble breathers

Dear Editor: While reading the Dec.-Jan., 1960-61 copy of your delightful conservation journal, I came across the paragarph headed "Oxygen" on page 41.

I have taken the liberty to write you in the hope that you can advise me of the origin of this popular belief. I would very much like to know who made the original observation and where.

Granted, it seems pretty plausible, but when I read (in other literature) that the muskrat expells its used air in one large bubble under the ice for re-oxygenation prior to breathing it in again, I must confess to being rather skeptical.

This seems to be turning up in a lot of literature these days, and as somebody is sure to try and get me in a corner over it, I would very much appreciate your comments.

Bernard S. Jackson,
Wildlife Information Officer,
Dept. of Mines & Resources,
Province of Newfoundland

• I have been through my card file on muskrats and, much to my surprise, I found none which made reference to the re-breathing of ice-trapped air by these rodents. As a child, I hunted muskrats each fall with my brothers. The time of hunting was a brief period when the ice was thin but strong enough to support our weight (part of the time). It was a simple matter to drive muskrats from their houses and follow them as they swam close to the ice. Eventually, some of them would come to rest against the ice, and if memory serves me, I cannot recall a time when an air bubble was not close to their nose. We assumed they were there to rebreath the air, and eventually, this became a fact to us. Thus, you see, I have, as an adult, stated this as fact without stopping to reflect. Now I shall. In early fall, it is unlikely that anaerobic conditions would prevail in the waters of a marsh together with an accumulation of the products of reduction—methane and hydrogen sulfide. Rather, it seems safe to assume that such waters would be saturated or supersaturated with oxygen. However, to expect an exchange of gases between the exhaled air and the water, at a rate to benefit a harassed muskrat, cannot be assumed. Such would be unlikely. Your skepticism has been of service to me. If enough persons were willing to question conclusions, possibly our inclination to speak without thought would be curtailed. —Arthur H. Cook, Conservation Biologist, N.Y.S. Conservation Department

"The 900 Strip"

Dear Sir: I am sure you are getting many complaints from fishermen and hunters, etc. This not a complaint, but I am worried about a particular stream that we fish and love very much. It seems to be getting away from us, foot by foot.

This stream comes out of the hatchery at Caledonia, known as "The 900 Strip" to local people, downstream south of the hatchery.

Private and self-seeking clubs seem to be grabbing chunks of it every year. It is rumored that we may lose the rest of this stream for public fishing by next trout season. I hope this is not true. This strip has provided first class fishing for hundreds of fishermen. Can't the State conservation authorities save this stream for public fishing? Must we lose it?

Albert DiPiazza, Batavia

• The State-owned section of Spring Creek, which lies immediately below the B. & O. Railroad crossing, consists of 935 feet on the east bank and about 300 feet on the west bank. To the best of my knowledge, the State-owned portion of "The 900" has not changed my in extent since the days when I first fished it back in 1928.

As I indicated above, most of "The 900 Strip" is State-owned on the east bank only. Despite the fact that most of the west bank is privately-owned, fishermen have been permitted to walk along the bank and fish down to the point where both banks are privately-owned. I suppose that the status of this privately-owned portion along the west bank could change any time and it will depend largely upon how well the fishermen respect the privacy of the stream below.

In any event, the State-owned portion of "The 900 Strip" should always be available for public fishing. However, I appreciate your interest and concern in "The 900 Strip." The State has few comparable trout waters.—Udell B. Stone, District Fisheries Manager

The world over

Dear Sirs: The sewer pollution of the salmon rivers is creating a problem in Norway. In the January issue of THE CONSERVATIONIST, 1960-1961, I see that you have the same problem in U. S. A. At the present time we are discussing here in Norway, how much pollution a river can stand before the salmon stock will be destroyed. As I believe you have been working with the same problems in U.S.A. for a long time, I take the liberty to ask if you have come to anv critical values of bacteriological or chemical nature (coli, NH_3, NO_3 or the like) which ought not or should not be exceeded in deference to the salmon.

If you could give me an answer to this question, or refer to any literature which could throw a light upon this problem, I should be very grateful.

Bj. Kjos-Hanssen, Stavanger, Norway

• In New York State we have no sea-run salmon, so it is rather difficult to evaluate the point at which diminishing return would indicate a significant effect or altered water quality. We do have some landlocked Atlantic Salmon and find in suitable water a large proportion of Atlantic salmon will landlock. Most of the waters containing salmon are relatively pure with few significant sources of pollution in tributary waters. The few exceptions would be the Oswego River, where some fingerling stocking has resulted in the return of some fish from Lake Ontario, and one of the tributaries of Cayuga Lake where there has been some spawning fish return in spite of sewage pollution near the mouth. Effectiveness of spawning in these waters has not been evaluated. The pollution is not gross, at least at the time of the run, but could be evidenced by chemical analysis.

Since we do not have specific values for salmon, I am including suggested ranges for trout. These are based on a median alkalinity of 100 (methyl orange) and should be adjusted upward or downward depending on how this would affect the toxicity.—G. E. Burdick, Senior Aquatic Biologist

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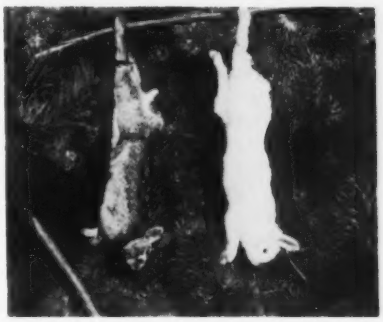


White cottontail?

Dear Sir: I enclose photo of cottontail rabbits which were shot in East Chatham, Columbia County, November 17, 1960. Both rabbits are identical in size and shape, but for the white cottontail it sure is a picture to see (no, it is not a snowshoe). I have shot plenty of snowshoe rabbits in your State and have been a non-resident hunter for the last 40 odd years. Please, could you tell me if there were a great number of these rabbits shot before? In fact, I have never heard of a white cottontail rabbit. I have talked with plenty of old timers and they never had seen or heard of it.

Jacob Junta, Sr.,
Midland Park, N. J.

• I, too, have never before heard of a white cottontail and from the photograph, it very definitely appears that this is a true cottontail. The only possible thing it could be other than a cottontail is a partially grown domestic rabbit. Judging from the photograph, the body conformity is not that of a domestic. However, we would be very happy and, in fact, eager to inspect this animal critically, if you would be willing to ship it to us. If you wish, we would be happy to ship it back to you in the same condition as received, after we have checked it thoroughly. You have it already frozen and it could be packed in dry ice and shipped via railway express, collect to the Wildlife Research Laboratory, care of Donald Schierbaum, Delmar, N. Y. It should be shipped to arrive in mid-week, since there is no one at the lab over the week ends. The dry ice should not be allowed to be in direct contact with the animal; it should be packed in paper and placed along side. Unless you wish to keep this animal and preserve it, we would like to make sure it is mounted and properly cared for. I believe we could have it included in the collection of our State Museum. Thank you very much for informing us of this rare oddity.—Joseph Dell, Conservation Biologist

Can't bear bear

Dear Sir: The first week end of deer season 1960, our party was fortunate and killed two nice bucks. We hunted this same area the next week end and the "innards" of these same bucks were gone, even the contents of the stomach. We killed a bear and doe on this second week end and again found no trace of the deer "innards" after that but the bear "innards" were still where we dressed the bear, on the last week end of the season. As far as we could tell, nothing had ever touched the bear entrails. What eats the deer "innards" before they hardly cool off, but will not touch the bear "innards?" In this area, near Big Moose, we have seen several bobcats, coy-dogs and four bear this past season while hunting. Do any of these prefer deer but pass up bear entrails, even when it's there all season?

H. H. Luther, Utica

• *Your experience of last fall regarding the deer and bear entrails is typical. Almost all the flesh eaters, from mice to bear, will eat deer entrails but nothing—even jays—will eat any part of the bear. At times moles and shrews will nibble around the lungs and liver of bear but as a rule they lay there undisturbed.—Edward Maunton, Conservation Department*

Pellets for trout

Dear Sir: After reading the article, "New Trout Miracle," by Kenneth Lowe in the 1958 *Fisherman's Digest* by Tom McNally; I began to wonder if the New York State Conservation Department is using a similar process to raise hatchery trout. Mr. Lowe tells us of a fish food formula developed by the State of Michigan's Conservation Department which cut the cost of feeding hatchery trout by $83,000 the first year and at the same time produced 157,000 pounds more of trout per year.

Instead of feeding the trout liver, which was becoming more expensive as time progressed, they fed them a dry pellet which they developed. It is said that trout reared on these pellets look better and taste better than trout raised on liver. Also, the rate of growth is much faster.

Does the New York State Conservation Department use these pellets, and if so, what has been your experience with their use?

William Faure, Schenectady

• *New York State was one of the first to develop pellets for fish food. This was accomplished in 1953 in co-operation with the propagation section of the Bureau of Fish, the Cortland Nutritional Laboratory and one of the commercial feed mills. Since that beginning, the State hatcheries have used an increasing amount of pellets and our formula has been changed several times to improve the structure of the pellet as well as to increase the nutritional value.*

This State starts trout fry on an all meat diet and continues until they are about three inches in length at which time the diet is changed to our small size pellet. As the trout grow, larger size pellets are fed. We, in New York, supplement the pellets with some meat as our experiments have not convinced us that the dry feed in pellet form is a complete diet. This and many other agencies, including commercial mills, are working continuously to improve the pelleted trout feeds. Some manufacturers of pellets claim a complete and balanced diet and this State, among others, is experimenting with various of these commercial products.

Since the feeding of pellets was put into general use throughout the fish hatchery system the pounds of food to produce a pound of fish have been reduced from 3.83 to 3.1 and the cost reduced from 46 to 31 cents. Based on the average production of 500,000 pounds of trout a year, an annual saving of $75,000 has been effected. It should be pointed out that improved hatchery techniques are responsible for some of the savings.— K. B. Nichols, Superintendent of Fish Culture

Cree canoe caulking

Dear Sir: In your December-January issue you published a letter from a Mr. Clarence Martin, of Amsterdam, in which he asks if you can advise him as to what he should use to seal the joints in a birch bark canoe. In the off-chance that Mr. W. E. Petty—to whom you referred Mr. Martin—cannot tell him, I can advise that for many years I have watched Indians seal their canoes with a mixture of resin (purchaseable at any hardware store) and lard.

Originally, I suppose, the Indians used spruce gum collected by themselves but have found that purchased resin is less troublesome. The Indians heat the resin and lard until it becomes a viscous liquid and then drub it onto the seams and smooth off later with a piece of heated iron. Unfortunately, I cannot supply the exact proportions of resin and lard but a little experimenting should produce the answer: too much resin will produce a very brittle mixture which will crack off, too little resin will have the opposite effect.

In closing, I might mention that there are quite a number of Indians making birch bark canoes on limits which I manage: they sell these canoes—when they can find buyers—for about $5 per foot. Should any of your readers wish to purchase, I would be only too pleased, as a service to the Indians, to put them in touch with the band or, if your readers' Cree has become a little rusty, act as their agent in arranging the purchase.

R. E. Kirkpatrick,
The Ice House Road,
Grand'Mère, P. Q., Canada

Big snake

Dear Editor: On September 9, 1959, my son, E. P. Creaser, Jr., observed a dog killing a large ribbon snake (or garter snake) in the woods about 2 miles northwest of Chestertown, Warren County.

The specimen was taken and measured and proved to be a female with many young in the vicinity. The snake was 43 inches long, and was identified from Blanchard's key as *Thammophis sirtalis sirtalis*. We still have the preserved skin nailed to the wall of our Adirondack cabin, and labelled jokingly as a "world's record."

I am wondering if it really isn't an unusually large specimen of this species of snake and may be actually a world's record ribbon snake. Perhaps you have information on this.

I have seen the same species early in April near Stony Brook, sunning themselves in patches of vegetation surrounded by snow.

E. P. Creaser, Sr., Chairman,
Biology Department,
Hofstra College, Hempstead

• *Unfortunately, your snake is not a "world's record," but it is certainly a very big one.*

Roger Conant in his "Field Guide to Reptiles and Amphibians," published in 1958, gives the average range in size of the garter snake as 18" to 26" and lists the record size as 48". He gives no further details about the record, but obviously any garter snake over 26" must be regarded as big for the species.

Your snake might be a New York State record. A brief check of the recent journals since 1958 of snakelore has not disclosed any snake larger than 48" nor has it mentioned any even as large as your 43".

Garter snakes are, of course, harmless but when they get to that size they can be as mean as any other big snake. I know a lot of people who would be happy if most garter snakes were little ones.—E. M. Reilly, Jr., Curator, Zoology, N.Y.S. Museum and Science Service

Young skulls and old

Gentlemen: Is there anyone on your staff who has studied formation of skulls of deer or similar animals? I just finished mounting on plaques the skulls of a 4-point buck, a spike doe, and a 6-point buck which were shot this season.

The two bucks have a very moderate U-shaped line resembling stitching coming down, with the bottom of the U centering between the base of the horns. Then there is a similar vertical line continuing down to about between the eyes, then just a straight line down the center of the forehead. On the doe, the U is barely visible and there appears to be no vertical line down the center of the forehead. If you have any information on this, or know where I could obtain it, I would appreciate knowing.

Thomas J. Cockrell, Monroe

• *The skull of all animals is composed of many individual bones. In the immature (growing) animal these individual bones are clearly discernible by the lines (as you said "resembling stitching") between the bones. In the mature animals, these lines sometimes become difficult to see. When this occurs, growth has virtually stopped and ossification is complete. The antlers of a deer grow off the right and left frontal bones. The line between the eyes is the median division between these two bones. The bone behind the U-shaped line is the parietal bone. Behind this bone is the occipital bone. You should be able to find a book on the anatomy of domestic animals in your local library or in the library for the science classes in your local school. A skull from a young deer would make an interesting subject for study and comparison.—C. W. Severinghaus, Leader, Big Game Management Investigations*

Executioner

Dear Editor: I have been raising quail in a cage that's on the ground covered with one-inch mesh, chicken wire. Recently I found several of them dead in the morning, with just their heads missing.

Could you tell me what kind of animal is eating the head and leaving the rest remain? And what can I do to prevent this?

David B. Donno, Huntington, L. I.

• *From your description, we believe this is the work of a great-horned owl. It is quite characteristic.*

Apparently the owl must perch on the top of the pen and as the birds are excited and fly to the top of the pen, they poke their heads through the wire and the owl promptly decapitates them.

The only way this can be prevented is to place another false top six to eight inches above the top of the cage or pen in which the birds are confined.—Earl R. Holm, Superintendent, Game Farms

Not protected

Dear Sirs: I would like to suggest that you give the names of birds, hawks, owls and small game that are not protected in the next issue of THE CONSERVATIONIST.

Harry G. Heinlein, Brookfield

Your question is a good one. It takes a pretty thorough search of the Fish and Game Law to reveal the birds and animals that are not protected. Here they are: Birds *—English sparrow, starling, crow, purple grackle, kingfisher, and pigeons (those in the wild).* Mammals*—Coyote, Canada lynx, gray fox, red fox, bobcat, Canada porcupine, opossum, red squirrel, woodchuck, Eastern flying squirrel, least weasel, chipmunk, Bonaparte's weasel, N.Y. weasel, Norway (house) rat, Allegheny wood rat, rats, mice, moles, shrews, and bats.—Earl A. Westervelt*

Limekiln Lake

Gentlemen: I am thrilled to read, as were no doubt many others, of the recent acquisition by the State of Limekiln Lake and 15,000 acres in the beautiful area south of Inlet. It has been many years since I have been to Spruce Lake and West Canada Lake and the other parts of that beautiful wilderness area.

No doubt Limekiln Lake will become the site of one or more campsites which will be reached by road from Inlet. I would like to respectfully suggest that Limekiln Lake be set aside as a lake free from motorboats. There is to me nothing more ruinous of the whole value of a lovely, unspoiled Adirondack lake than a noisy and smelly motorboat. Surely it would not be unfair to keep the motors away from just one lake, to leave it for the canoes and rowboats only, and permit those who just want to swim to do so without inhaling the wretched fumes and risking being cut up by the blades of the motorboats which in so many places make a mockery of the mandate "forever wild."

David Sive, Pearl River

Black walnuts

Gentlemen: Enclosed herewith, I am sending you a sample of black walnuts I received this fall.

These seem unusual to me in that each shell contains two large meats instead of the usual three smaller ones and I find that they are much easier to extract than any I have used before.

If these are better than the usual crop, I am sure you will be interested; otherwise, no harm has been done.

I believe that these are the first crop from a tree my brother planted and raised from a nut on his farm on the Pelps road about three miles north of Rushville.

It will be interesting to know your opinion of these nuts.

J. T. Greene, Glens Falls

• *The black walnuts, which you sent, seem to be normal for any of the nut tree seeds will contain two meats, or cotyledonous leaves, which are the food storage parts that give the embryo its start until it has produced roots and true leaves that can supply the necessary food and water. I would be very much interested in seeing nuts containing three meats, as this would be the unusual condition. Do you still have any of these?*

I sawed one nut in midsection so as to compare size of meats, thickness of shell and overall size of the nut with pictures of those from the specially selected trees like "Thomas," "Ohio," "Stabler" and "Snyder." This, to my unpracticed eye, would rate as a good nut, but not outstanding, since the shell is quite thick. For an expert opinion, you might send a few to Dr. George Slate, New York State Agricultural Experiment Station, Geneva.

If you wish to read up on this subject, I would recommend a book, Reed and Davidson's "Improved Nut Trees of North America." They have four chapters on the black walnut alone. I quote in part:

"To compare well with the best varieties, the nut should preferably weigh between 24 and 30 grams and should yield close to 25 or 30 per cent of kernel. In other words, the kernel itself should weigh 5½ to 7½ grams or more. Of this, nearly 90 per cent should be recoverable in quarters or large pieces . . . the quarters or halves bring a better price. . . ."—Ralph H. Smith, Conservation Biologist

Credits

First cover, pages 12, 24, 25, 27, 37, H. Wayne Trimm; second cover, Hy. S. Watson; 3, Roy Irving; 4, 5, 19, 38, Earl McGuirk; 6, C. W. Greene; 7, Greene, Ernest W. Blue; 8, 9, 10, 11, Marsh Photo, Maine Forest Service; 13, U. S. Forest Service; 14, Dr. Roger A. Morse; 16, 17, Ellen Edmonson; 20, 21, Dr. F. U. Klaehn; 28, 29, 30, 31, Doug Payne; 32, Payne, Nathan Horwitt; 33, 46, Matthew Casey; 34, Nick Drahos; 35, McGuirk, Fred Chambers; 36, Fred Oettinger, Lockport Union-Sun and Journal; 39, U. S. Dept. of Agriculture, Oak Studio, Fulton; third cover, Austin S. Hogan; fourth cover, N. Y. S. Museum.

Fly Fishermen's Bicentennial 1761-1961

(Continued from page 48)

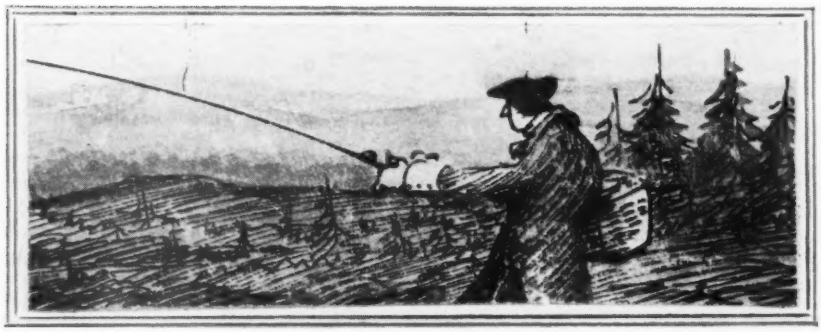
Dry fly fishing became extremely popular with the appearance of the brown trout in streams that had been unproductive for many years. Any real antagonism toward its stocking (everyone loves the spectacular beauty of our native trout), vanished in the fumes of the rattling "tin lizzies" that liberated thousands of anglers who had been tied to their home waters by the horse and buggy. The automobile opened the way to new adventures whereby the fly fisherman from Sullivan County could quickly and cheaply try his patterns on the Ausable and return with patterns conceived by fishermen of that region. Anglers found the brown trout a versatile fish that responded so well to the fly that wherever they traveled its presence insured good sport. Bass fishing also increased in popularity so that by 1925 the complete fly book contained Mohawk Valley bucktails, St. Lawrence streamers and imitation grasshoppers side by side with wet flies from the Battenkill and dry flies from the Neversink. Travel not only broadened the general knowledge of the sportsman as to ways of taking fish, it also focused attention on the fact that the conservation of natural resources was the concern of all sportsmen and not to be turned to the singular benefit of any region or any class of anglers.

It has been 200 years since Sir William Johnson erected his fishing house on the Sacandaga and in the intervening seasons fly fishermen have changed their rods from ash and cedar to split bamboo and again to glass. Lines, once hair or silk, are now of synthetics and fly patterns are a curious blend of the old and new. Few of the younger generation have ever seen a scarlet ibis tied on gut or an old-fashioned deer hair hackle riding white water.

These are of the past along with soggy bass flies that would put a set in a rod without ever taking a fish. Restrictive laws prohibit the taking of excessive creels and with the expansion of State-owned lands and the acquisition of public fishing rights on first class trout waters, the fishing opportunity is growing greater year by year. Although at times the streams and lakes may be crowded, open water is still the rule and the thrill of the strike is the same now as it was 200 years ago when Sir William Johnson cast his flies upon the Kenneyetto.

Fly Fishermen's Bicentennial 1761 - 1961

by Austin S. Hogan



Kenneyetto Creek, a tributary to the Sacandaga, scene of Sir William Johnson's early fly fishing operations, is still rated as a trout stream although a far cry, I'm sure, from its 1761 quality. The upper ten miles of the stream is stocked annually with trout; some six miles of the headwaters with brook trout and approximately four miles below with browns. From that point to where the stream enters the Sacandaga Reservoir it is too warm for trout and fairly well populated with such stuff as great northern pike that run up from the Sacandaga Reservoir. Probably a good thing, under these circumstances, that Sir William is unlikely to return to his 1761 fishing grounds.—Editor

TWO hundred years ago, Sir William Johnston, Baronet, His Majesties Superintendent of Indian Affairs for North America, cast his flies to the trout of the little Kenneyetto in upstate New York. Fly fishing in the colonies was almost non-existent, if the evidence of contemporary journals and printed matter is to be accepted, making Johnson a solitary figure. Perhaps fly fishermen were rare because the early years of settlement were too rough and nasty for even the hardiest of anglers to risk their scalps for a basketful of fish. Although historians have seemingly forgotten to speak of the sporting life in the New World it is hard to believe there were so few transplanted Irishmen, Scots and Englishmen who could forget the rise to the fly on the Tweed, the Dove or the Shannon when watching the trout of some lonely wilderness lake. Johnson was an ardent angler who didn't forget and, at the close of the French and Indian War, worn from the affairs of business and state, he sought relaxation fishing the streams of what was then Tryon County. To make his fishing more comfortable and more enjoyable he built for himself and his friends the first privately-owned fishing house in all the colonies.[1] The place was on a hill overlooking the winding Sacandaga River.[2] The year—1761.

Johnson grew up in an Ireland where every great house had its kennels, game cock roosts, thoroughbreds and hunting preserves. Many estates had their own trout and salmon rivers carefully guarded by wardens and bailiffs. The fashionable angler had his book of flies, tapered horse hair lines, single and two-handed rods and, as befitted the gentleman, a ghillie to bait the hook, change the fly and see to it that lunch and wine were served under the proper circumstances. This was the sporting background of Sir William Johnson and it leaves no doubt he was familiar with hackles, Palmers, winged May flies and black gnats. Such was his genius that he became one of the richest men in the colonies with mansions at Fort Johnson and Johnstown, a summer villa called Castle Cumberland at Broadalbin and, four miles away, the fishing house on the Sacandaga. With its establishment, Sir William had succeeded in transferring the angling traditions of Ireland and England to the edge of a wilderness. His favorite trout stream, the Kenneyetto was within a step of Castle Cumberland and, in its upper reaches, not far from the fishing house. Both Castle Cumberland and the rustic lodge were burned during the Loyalist raids of 1781.

Perhaps the ashes of the fishing house were symbolic for they marked an end to angling in the grand manner before it had even obtained a foothold in the New World. In England, private ownership had effectively barred the general public from the better trout and salmon waters but in the colonies open water with its attendant supply of fish was almost a necessity for survival. This was a significant factor in the growth of sport fishing in the State of New York, for at the close of the Revolution thousands of acres of Crown and Loyalist properties entered the public domain. These new public lands and waters remained open, even when transferred again to private ownership and with other private properties became a paradise for hunters and fishermen. Privately-owned waters in Johnson's day were kept open by the generosity of the owners, not by law. The rights of the individual against trespass and the misuse of property were the same then as now. Actually the freedom of the frontier, first through neces-

(1) Stone, W. L. Life and Times of Sir William Johnson.

(2) This part of Sacandaga River is now covered by the waters of the Sacandaga Reservoir, but the site of the fishing house still gives a breathtaking view of the valley.

sity and then by custom, extended its influence from the time of first settlement to well into the 19th Century. It was inevitable, under these conditions that the Catskills and the Adirondacks, the last to be settled would attract multitudes of anglers. Fishing in the wilderness was free, romantic and adventurous. Because of the circumstances surrounding its beginnings, sport fishing in New York has always retained some of the spirit of the old frontier, with the sharing of public and private waters the rule rather than the exception.

All this was of little importance to anglers of the time; waters had always been open, but the exodus of thousands of Loyalists, who under normal circumstances would have established the practice of fly fishing, a financial depression lasting for twenty-five years, and another war with England in 1812, were not conducive to sports of any kind. If fly fishing was slow in becoming popular in America it might also be remembered that fly fishermen who could teach were rare, tackle expensive and illiteracy so widespread that in isolated settlements bait fishermen who had fished all their lives might never have read about or examined a fly.

When peace and tranquillity did come to the nation, bait and fly fishermen moved into action with almost explosive energy. Stump Pond at Smith Town, Snedecor's at Islip and Carman's at Fire Place, all on Long Island, became famous for trout averaging two pounds and even more famous, when one was caught weighing fourteen and one-half pounds. A carved wooden effigy of this huge fish was still in existence in 1919, the property of Clinton Miller, Brookhaven. A Mr. A. F. Young, fly fished Fall Creek, Grotten, in 1831 and, in 1835 the Rev. George W. Bethune of New York City, Henry Vail of Troy and John B. Duane of Schenectady penetrated the Adirondacks to take trout on flies from Piseco Lake. First rods on the Beaverkill—Judge Finch of Catskill, William Adams of New York and John Smedburgh of Prattsville, presumably fly fishermen—never took a trout over fifteen ounces yet creeled twenty pounds each day (1838).

It wasn't until 1840 that Bethune and his friends persuaded William T. Porter, editor of *The Spirit of the Times*, a New York sporting weekly to enrich his angling experiences with a trip to Piseco. Hamilton County was already famous for its fine fat brook and lake trout featured at Delmonico's, so Porter needed little urging. His report of the journey describes the route up the Sacandaga Valley to Lake Pleasant, hotels and taverns and in regard to the fishing advises his readers to take along a hank of salmon gut for leaders, the lake trout were so heavy. And—

> "With regard to flies use your own discretion as to color but be sure they are large—whatever you choose be sure you have your book filled with the red and brown hackles; you should have too, green drakes, grey Palmers and blue jays. Make their bodies gay and brilliant and the longer their wings and tails the better. The most killing fly we ever used, we tied during a gale on Piseco Lake. It was a large, gaudy and coarsely made thing; but a regular killer; body, dark blue hackle with blue wings, and tail tipped with white, of the blue jay—head of golden red from a black bird's wing."

The dressing of the blue hackled Piseco Lake fly, the first Adirondack pattern to be offered through the pages of a sporting publication, indicates that early New York State fly dressings were taking on some of the rowdy character of the wilderness.

In contrast, John Brown, author and publisher of America's first book on fishing, "The American Angler's Guide," (1845), gave a list of English dressings, obviously more refined, that included the red spinner, the yellow May, the black gnat, the iron blue dun and the stone fly. Of these, only the black gnat has retained its original make up of white wings and peacock herl body. Bethune gave a list of flies in his edition of Walton's "Complete Angler," (1847), that seem to be a mixture of English and American styles. They evidently were products of his own experience. Frank Forester, writing "Fish and Fishing in the United States," (1849-50), illustrated his text with engravings of trout and lake flies, heavy of body and scraggly of wing. Forester had spent ten days at Lake Pleasant before being driven out by black flies and it is doubtful if that journey had much to do with his recommendations for useful fly patterns, but the general trend was to feed the fish larger and brighter flies than those considered traditional. When trout responded to this type of dressing, it is obvious there would be little concern for any theories based on copying the natural.

What was considered sporting has little in common with the ideals of today. Brown lauded fly fishing but at the same time had no fault to find with spear fishing while Bethune, with all his emphasis on Isaac Walton, Sir Charles Cotton and the gentleman's way of fishing, took delight in describing the butchery of a deer swimming for shore. It must be emphasized that life was hard and fish, whether they came from Hamilton County or elsewhere, were an important food supply. The taking of large quantities was customary to both sport fishermen and commercial fishermen. "Fishing for count" was about the only way a fly fisherman could assert his superiority or measure his abilities. In reality there was little difference in points of view between the commercial fisherman and the fly rod man except in the selection of terminal tackle.

It is interesting to note that the cost of fishing tackle (1840) was about the same as it is today. Fly rods sold from $5 to $28, usually 12 to 20 feet in length; constructed of three pieces with a hollow ash butt, the second joint of ash or bamboo and the tip of lancewood or whale bone. Cedar and hickory were also popular. One-piece rods of Calcutta reed or bamboo could be purchased quite cheaply. Lines averaged 6 cents a yard. Those of silk, hair, silk and hair, or fine linen, tapered, were about $5. A popular line was made of India grass, brittle when dry but strong when soaked in water. Lentner, a rod maker of New York City, made Porter a special combination rod for "panfish or a thirty-pound salmon" that had four joints for bass or pickerel, five for trout and salmon, fluted guides instead of rings, double ferrules, and mountings of German silver; the whole weighing not more than three pounds. One of the novelties of the day was a walking stick rod with its case of cast iron. Top price on flies was 50 cents a dozen but most were made by the fly fisherman at home or at the waterside.

The first century of fly fishing passed with improvements in fishing tackle progressing in the direction of finer and lighter rods and the substitution of silk and gut for the more common horse hair line and leader. The long and perhaps cumbersome rod had its advantages in that back to the wind, the fly could be kept on or below the surface while the comparatively short line was kept out of the water. There was also the advantage of rod tip control, whether the fly was fished upstream or down. The angler guided the fly with the flow of the current, let it sink or dibbed it on the surface, working the fly in any desired manner on the retrieve. The long rod remained popular until the perfection of the six-sided split bamboo, smooth surfaced lines and better guides enabled the angler to make longer casts. Then the trend turned to shorter and lighter rods but control of the fly was no longer at the rod tip. The longer cast put the fly at the whimsy of the current forcing the angler to become more skillful in his

presentation. The lighter, stronger and shorter rod, however, covered more water and was far more efficient.

With so many tons of fish being constantly removed from the waters, it is remarkable the supply lasted as long as it did. By 1870, veteran fishermen, remembering the hundred trout creels, were loud in their claims that New York was fished out. "Adirondack" Murray, who had once praised the advantages of life in the woods through his books, brought down the wrath of sportsmen by ranting and raving in an article appearing in *The American Sportsman* (1872), that New York was finished. He advised anglers to forget New York and go to Maine. Actually there was plenty of good fishing, but as George Dawson put it, the woods were littered with "cockneys" in long boots, velvet pants and jacket, bowie knife and pistol and a jaunty hat full of gaudy flies. The sporting life and especially fly fishing had gone ultra fashionable. High society, seeking a breath of fresh air, established colonies in the north woods comparable in architectural splendor and comfort to similar gathering places at the seashore. The mere presence of socialites acted as a magnet drawing more and more people to the mountains which in turn produced a boom in sport fishing. The demand for fish, netted for the hotel table or to be caught by the amateur sportsman far exceeded anything the waters could produce. Fortunately, fish culturists were succeeding in making it practicable to propogate game fish by artificial methods but unfortunately public pressure plus the enthusiasm of the fish culturists resulted in wholesale plantings of Atlantic salmon, Pacific salmon, California trout, shad, carp, brown trout, landlocked salmon, smelts, little "blue backs" from Maine—any type of fish that could be induced to hatch and live. These were dumped wherever there was water, with hotel keepers, tourists, sportsmen and the politicians exerting pressure to keep up the good work. Most of the stocking was, of course, useless but there was little concern that uncontrolled stocking might be a waste of time and money.

Chiefly through the efforts of Fish Commissioner Robert B. Roosevelt, State Hatcheries Superintendent Seth Green and State Fish Culturist A. Nelson Cheney, the public gradually learned restocking depleted waters required a little more than the artificial insemination of eggs.

During this bizarre and curious period of our fishing history, languid ladies cast flies to the distant tinkle of mandolins. Hiram Leonard made a rod with gold fittings and an amethyst set in its butt, cottage lots on the St. Regis lakes were valued at $50,000 and gentlemen in afternoon dress practiced fly casting on the lake in Central Park. In the background, Sarah McBride of Mumford was writing learned essays on trout stream entymology and tying flies patterned after American insects. Bass fishermen were beginning to find that the smallmouth would take a fly and the dry fly was becoming a subject of interest to anglers who appreciated the subtleties connected with its use.

With high fashion leading the way, the majority of fishermen were enamored with patterns so fanciful that compared with those of any other age they appear both fantastic and ridiculous. It was not until plantings of the brown trout had begun to take effect that fly fishermen realized that perhaps they had gone overboard with their exotic and eye catching patterns. Frank J. Amsden had the honor of taking the first brown on a #16 fly, from Spring Creek near Rochester, in 1885; and fishing at night, July 26, 1886, he caught another from the same stream weighing three pounds on a floating pattern of a May fly. The dates are rather significant in that they were the beginning of a new era for fly fishermen. Theodore Gordon pointed out that foreign patterns should be discarded and the angler should copy the natural as closely as possible (1890). Gordon, one of the greatest of American fly fishermen, fished Catskill streams for 25 years.

It has been stated that one of Gordon's chief contributions to angling was that he linked American and English traditions. Undoubtedly his correspondence with the English masters, Halford and Skues, were profitable but Gordon was an individualist who, in the course of his experimenting, tended more and more to escape from tradition. His inquiring mind guided his nimble fingers in the designing of dressings that expressed a completely personal approach to the problem of giving an artificial true environmental characteristic. The result was a never ending succession of patterns, each relating to some personal experience. This might be considered a traditional approach if it were not in his later years, Gordon transcended the older philosophies by seeking to *create* flies true to the aquatic environment rather than seeking to copy the natural. He also experimented with trout nymphs, bass flies and lures of hair and feathers—the latter forerunners of the modern streamer. Gordon refused to fish private waters, stating that this violated his code of sportsmanship.

(Please turn back to page 45 for conclusion)

Fly Fishermen's Bicentennial 1761-1961
(Key to Painting)

Row 1 (Colonial period):
Black Gnat, Cowdung, Partridge and Orange

Row 2 (Colonial period):
Red Spinner, a Soldier Palmer, a Hackle, a Dun

Row 3 (American, 1840):
Porter's Piseco Lake fly, his brilliant Red Hackle, his long Green Drake

Row 4 (American, 1845):
A Yellow Drake, Brown Mealy Moth, a Mayfly with detached body, Blue Jay

Row 5 (American, 1850):
A Dun, a Hackle, a Dun with upright wings

Row 6 (American, 1850):
Bee, Drake, Red and Green, a lure

Row 7 (American, 1865):
(The Roosevelt adaptations of English dressings) The Great Stone Fly, a Blue Dun, Cowdung

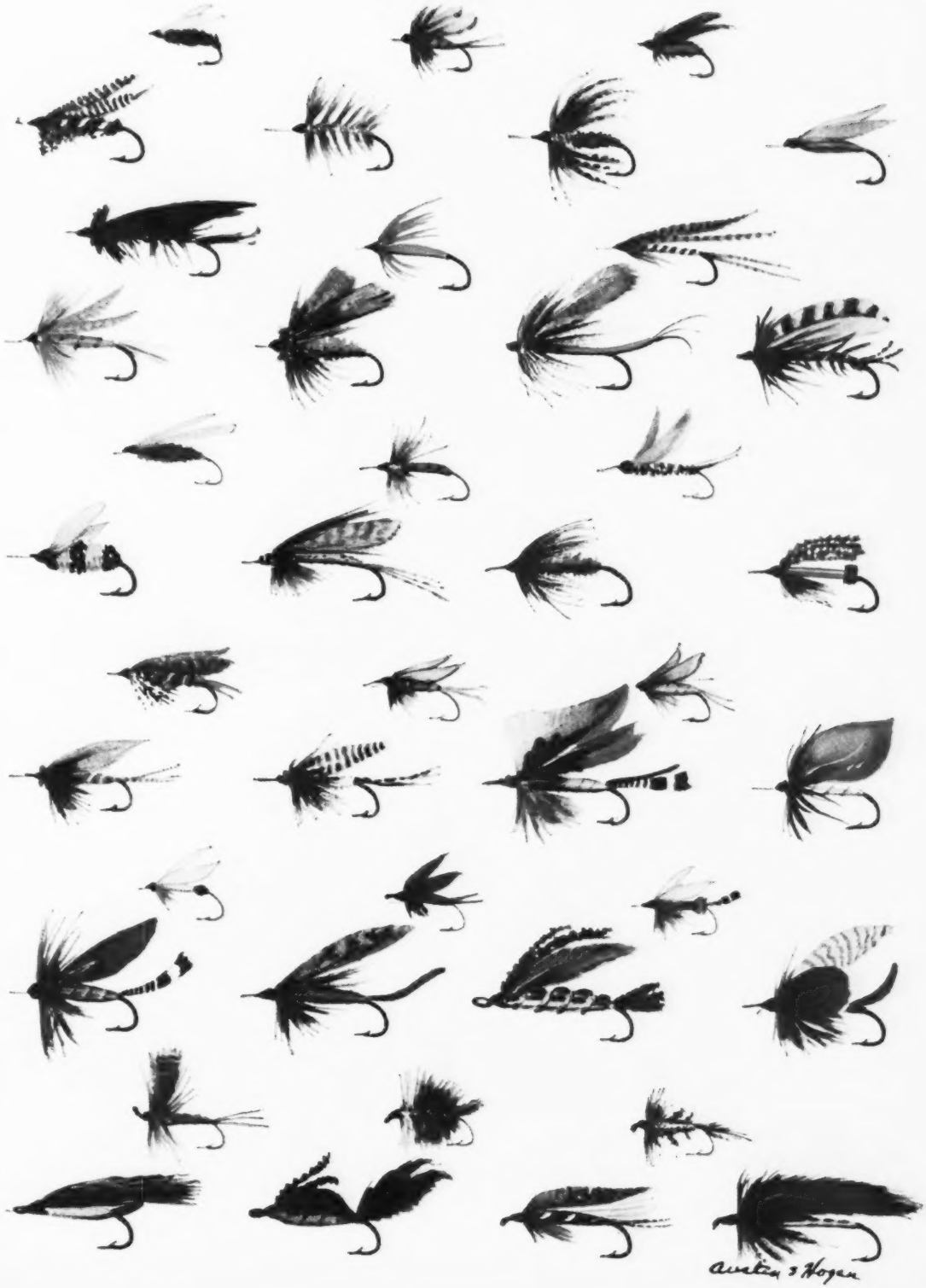
Row 8 (American fancies, 1870-1890):
Seth Green, Reuben Wood, Cheney, Oak Stewart (all bass flies)

Row 9 (American, —. . . .):
Grannom, a Scarlet Ibis, Royal Coachman

Row 10 (American, 1890):
Adirondack, Montreal, a streamer, the Barnwell (for bass)

Row 11 (American, 1900-1925):
A May Fly, Bivisible, a nymph

Row 12 (American, 1890-1925):
Mohawk Valley bucktail, a lure by Louis Rhead, a streamer fly, a hackle streamer.


Austin & Hogan

(Courtesy of N.Y.S. Museum)

Dutchman's-Breeches (Bicuculla cucullaria)